Revenue
1277

PAPERS AND PROCEEDINGS

OF THE

TALUKDARS' AGRICULTURAL MEETING

AND

EXHIBITION,

HELD AT

LUCKNOW,

8TH, 9TH, AND 10TH MARCH,

1881.

LUCKNOW.

PRINTED AT THE LONDON PRINTING PRESS, BY R. CRAVEN, LUCKNOW.

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No. 687 OF 1881.

RESOLUTION.

REVENUE DEPARTMENT.

Dated Naini Tal, the 2nd May, 1881.

READ—

A report by Major Noble, Secretary to the Oudh Talukdars' Agricultural Meeting, on the meeting held at Lucknow on the 8th, 9th, and 10th of March, 1881.

OBSERVATIONS.—This is an account of the first of an intended annual series of meetings to be held at Lucknow, under the auspices of the Talúkdars, with the view of promoting the interests of agriculture, introducing improved methods of cultivation, and developing the economic resources of the province. It had been intended that the first meeting should be held in the spring of 1880, but, owing to causes which could not be foreseen, it was found necessary to postpone it till the following year.

2. All the arrangements connected with the meeting were made by a committee of management, consisting of 16 members, 15 of whom were native gentlemen. The committee met publicly on each day of the exhibition for the discussion of various subjects of interest, among which were :—The possibility of the extension of irrigation by the action of the Talúkdars or of the Government, or of both, and the means by which such extension could be effected : the feasibility of improving the breed of cattle, and the means by which this object could be best attained : the improvement of ploughs, the advantages of thin sowing, and the extension of arboriculture.

Papers on these and cognate subjects were read by various gentlemen,—European and native ; and the proceedings (which were conducted entirely in the vernacular) were watched with intelligence and interest by a large number of persons, chiefly those interested in the land.

3. The exhibition comprised the following classes ;—

(1) Cattle.
(2) Agricultural implements.
(3) Grain and other agricultural products.
(4) Arts and manufactures.

4. Prizes and medals were awarded to the successful exhibitors, after careful inquiry and comparison by selected judges. The expenses incurred in connection with the meeting amounted to Rs. 11,039 ; the amount being met by a Government grant of Rs. 3,000 by Rs. 6,000 realised as subscriptions from the Talúkdars and others, and by the sale of tickets.

5. The Lieutenant-Governor and Chief Commissioner congratulates the Talúkdars of Oudh on the results of this, their first agricultural and industrial meeting. A satisfactory beginning has been made in starting a series of such meetings, which it is hoped may be instrumental in effecting a permanent improvement in the agriculture and general industry of

the province. The valuable information contained in the papers read on the occasion, and the free and intelligent discussion of the subjects which followed, can hardly fail, His Honor thinks, to be of use in exciting an interest in agricultural and economic subjects, which has hitherto been but imperfectly manifested.

Sir George Couper trusts that these meetings will now be of yearly occurrence; and that the Association will be able in future to fulfil its purpose in regard to them without any direct aid from Government beyond the recognised subsidy for cattle-prizes. What His Honor wants to see is the Talukdars of Oudh taking a direct and personal interest in the matter ; profiting by the information gained ; practising the agricultural improvements brought to their notice ; and thus helping on the economic progress of the province.

RESOLVED—That these remarks be communicated to the Secretary to the Oudh Talukdars' Agricultural Meetings, for the information of the Talukdars ; and that a copy of this Resolution be published in the *Gazette*.

R. SMEATON,
Offg. Secretary to Government,
N.-W. Provinces and Oudh.

No. 687½.

ORDERED that a copy of this Resolution be forwarded to the Director of Agriculture and Commerce, for information, with reference to his letter No. E., dated 29th March, 1881.

W. R. BARRY,
Offg. Under-Secy. to Govt.,
N.-W. Provinces and Oudh.

1881

AGRICULTURAL MEETING PROGRAMME.

TUESDAY, 8th MARCH.

7 A. M.—Committee Meeting in Canning College, at Kaisarbagh.

12 Noon.—Wrestling matches opposite to Chutter Munzil Club. Entrance 1st Class 1 Re., 2nd Class 8 As., 3rd Class 4 As., payable at the doors.

N. B. I.—A boat will ply daily at the stone steps to river at Chutter Munzil for convenience of people wishing to cross at that point. No charge made for crossing in boat.

II.—Luncheon and refreshments for cash payment will be provided near to wrestling enclosure, on 8th 9th and 10th March. Gentlemen are recommended to send their own kitmutgars.

3-30 P. M.—Exhibition of Agricultural products, and of Arts and Manufactures in the White Baradari in Kaisarbagh, also of Agricultural Cattle and Implements at Dilaram Kothi, opposite to Chutter Munzil, will be formally opened by Maharajah Sir Digbijai Singh Bahadur, K. C. S. I., of Bulrampore—Entrance fee of 8 As. payable at the doors, where also English Catalogues of exhibits with prices and full information, can be purchased at 8 As. per copy. Catalogues in Urdu can be had for 4 As. Many articles exhibited will be entered in the Catalogue as "for sale" and price will be noted. Purchasers can record their names at the door in a register to be kept for that purpose, but cannot receive possession of their purchases until 9 A. M. on the 11th March, when they should come or send for them "with cash" to the Baradari. At the same hour too the Flower Show will open in the adjoining Canning College building. Entrance to Flower Show 8 As., payable at the doors.

N. B.—In the four corner outside towers of the white Baradari, and also in the adjoining building called "Oolta Kothi" are 50 or 60 stalls in which are dis-

played the best specimens of Lucknow embroidery, metal work, shoes &c. These stalls are called the "meena bazar" and the goods therein can be purchased for cash. Many articles suitable for presents to friends in Europe will be found in those stalls.

Visitors should come amply provided with cash, as the stall keepers will not sell on credit.

The "meena bazar" will remain open on 9th and 10th March.

4 P. M.—Trial of agricultural machinery, mills, water-lifts, &c., opposite to Chutter Munzil.

9 P. M.—Illumination in the Hoseinabad.

WEDNESDAY, 9th MARCH.

7 A. M.—Committee Meeting.
Exhibition in Baradari open as before, but entrance reduced to 4 annas.

12 Noon.—Wrestling. Entrance charge as before.

4. P. M.—Ploughing matches near to wrestling enclosure.

THURSDAY, 10th MARCH.

7 A. M.—Committee meeting.
Exhibition in Baradari still open. Entrance on this day "free."

12 Noon.—Wrestling. Entrance charge as before.

3-30 P. M.—Darbar in Canning College large hall and distribution of prizes by His Honor the Lieutenant Governor.

N. B.—Mr. White, Principal of the Canning College, has been kind enough to arrange for seats for ladies in the galleries of the hall.

8-45 P. M.—Illuminations and fireworks opposite to Chutter Munzil Club.

LUCKNOW :
3rd March 1881.

A. M. E. CHURCH PRESS, LUCKNOW.

PROSPECTUS.

Oudh Talukdars' Agricultural Meeting to be held at Lucknow on 8th, 9th, and 10th March 1881, and following days.

1

For Plough-Bullocks bred and reared in Oudh and broken to the plough. Yokes to be of equal size and age, age not to exceed 7 years nor to be less than 2½ years :—

1 Silver Medal for best pair Plough Bullocks.
1 Do. do. do. Cart Bullocks.
5 Prizes @ Rs. 25 per Yoke.
5 Do. @ „ 20 do.
5 Do. @ „ 15 do.
5 Do. @ „ 10 do.
5 Do. @ „ 5 do.

2

For Bulls kept for breeding purposes only :—

2 Prizes @ Rs. 50 each.
5 Do. @ „ 40 do.
5 Do. @ „ 25 do.
1 Silver Medal for best Bull.
1 Do. do. do. do. Buffalo.

3

For Cows bred and reared in Oudh :—

5 Prizes @ Rs. 15
5 Do. @ „ 10
5 Do. @ „ 5
1 Silver Medal for best Cow.
1 Do. do. do. do. Buffalo.

4

For Calves between the ages of 1 year and 2½ years :—

5 Prizes @ Rs. 10 each.
10 Do. @ „ 5 do.

5

For Plough-Buffaloes bred and reared in Oudh (age, &c., as for Plough-Bullocks) :—

5 Prizes @ Rs. 15 per Yoke.
5 Do. @ „ 10 do.
5 Do .@ „ 5 do.

6

For the best Ploughs :—

10 Prizes @ Rs. 5 each.

Extra prizes at the discretion of the Committee. Prizes will also be given for good ploughing, the terms of which will be settled at the Meeting.

Prizes amounting to Rs. 600 in the aggregate will be given for the best samples of produce.

Prizes to the extent of ¼th of the amount notified above will be given for Cattle, in each class, which may be exhibited as bred elsewhere than in Oudh.

A Silver Medal will be given for best Plough.
A Do. do. do. 2nd best Plough.
Rs. 10 and certificate for 3rd best Plough.
A Silver Medal for best Sugar Mill (*kolhu*).
A Do. do. 2nd best Sugar Mill.

LUCKNOW:
15th January 1881.

C. S. NOBLE, MAJOR,
Secretary, Taluqdars' Agricultural Meeting.

APPENDIX B.

Proceedings of Committee Meeting, held on 8th March 1881.

SUBJECT DISCUSSED.—Whether, and how far, by the action of the Talukdars, or of Government, or of both, the extension of canal, or well, irrigation is possible, and if so, by what means?

1. Paper read by Raja Amir Hasan Khan Bahadur, Talukdar of Mahmudabad.

2. Paper read by Kunwar Harnam Singh Bahadur, Ahluwalia, manager of the Kapurthala Estates in Oudh.

3. Note on the cost of irrigation from various sources by Mr. J. Wilson C. E., together with extracts from certain settlement reports.

4. Paper read by Mr. F. N. Wright C. S., Director of Agriculture and Commerce.

FROM

AMIRUDDOWLAH SAEED-UL-MULK, RAJAH MAHOMED AMIR HASAN KHAN BAHADUR, MUMTAZ-UL-JUNG, RAJAH OF MAHMUDABAD.

To

MAJOR C. S. NOBLE, SECRETARY TO THE TALUKDARS' AGRICULTURAL MEETING, OUDH.

Dated Mahmudabad March 2nd, 1881.

SIR,

(1) Letter from Major D. G. Pitcher, Secretary, Oudh Talukdars Agricultural Meeting, to all Dupty Commissioners.

(2) Printed note referred to in Para 2 of (1)

With reference to the papers marginally noted and in compliance with the request contained in the Vernacular Memo. of the agricultural meeting dated 26th January, 1881, asking me to submit a written statement of my views on the question "Whether and how far, by the action of the Talukdars or of Government, or of both, the extensions of canal or Well Irrigation is advisable or possible, and if so by what means," I have the honor to state as follows :—

The question resolves itself into two distinct points, each of which I shall discuss separately and fully.

(1) proceedings of a meeting of the committee of the British Indian Association, Oudh, held on the 29th May, 1872.

(2) Memorial of the committee of the British Indian Association to the Chief Commissioner of Oudh.

(3) Do. to the Secretary of State for India.

As regards the first point, *viz.* "Whether and how far the extension of Canal or Well Irrigation is advisable or possible," I beg to say that in my humble opinion Canal Irrigation is quite inadvisable. In support of my assertion, I beg to direct the Committee's attention to the accompanying papers marginally noted, in which the subject has been exhaustively dealt with, and which embody the views of a large meeting of Talukdars, convened in 1872, to discuss the advisability of introducing Canal Irrigation in the Province. The present statement is but a brief recapitulation of the facts and arguments therein adduced, and should be considered as part and parcel of the same : and I beg that this may be read along with the abovementioned papers, to which it is a supplement.

I am strongly convinced that Canal Irrigation, if attempted at all, will be a source of mischief instead of benefit, not to the cultivators only, but to the people in general. My conviction is based on the following grounds :—

First, it is well known that Oudh, possessing a large number of rivers, is of all the provinces in Upper India most abundantly supplied with water, and we may properly call it a "Tarai." But this water has never been utilized for the purposes of Irrigation, because it has been found to be eminently injurious, as will be shown hereafter. Besides a large variety of rivers, it has so many jhils, tanks, and swamps, that it resembles the bed of a vast lake ; and hence it is that the damage to cultivation by an excessive fall of rain has, at times, exceeded that caused by a drought. In former years there was such a heavy fall of rain that the Province was almost inundated, whole villages were swept away, and vast tracts of cultivated land were utterly destroyed and rendered unfit for cultivation. The drought of 1877, and the serious consequences thereof which have led many to think

seriously of the means of providing against a future famine, and which might seem to afford some plausible grounds for the introduction of canal Irrigation, should be considered an exception and not a rule. It was a calamity, which, I believe, no human contrivance or foresight could guard against or avert. Its disastrous effects might be mitigated to some extent like those of an epidemic, but it could not be prevented or checked.

Secondly, long and varied experience has shown that the canal water is not beneficial to Agriculture. In this part of the country, it has been found to be positively injurious to the soil, being impregnated with sand, "reh," and other alkaline substances, which when spread over the cultivated land destroy its productive powers. In some places the quality of the land is so materially altered by irrigation with canal-water that it has become perfectly barren, and has failed to produce anything. With a view to ascertain the comparative value of Canal and Well Irrigation, I once caused a number of fields in my own Estate to be irrigated alternately with well and river water, (the latter being used as a substitute for canal water, as canals are supplied from rivers) and the result of this experiment was that the fields irrigated with well-water, produced a crop infinitely superior both in quantity and quality to that produced by irrigation with river-water. Canal-water is especially unfavourable to the growth of wheat, sugar-cane, poppy, tobacco and other products falling under the head "Kachhiana."

Thirdly, the gravest objection of Canal Irrigation is, that by increasing moisture and rendering the atmosphere damp, it will affect public health. Even those districts, which are remarkable for their good climate, will be rendered unhealthy, and not men only, but cattle also, will suffer from the injurious effects of the climate thus vitiated.

Fourthly, the cultivators will feel naturally averse to Canal Irrigation, and will not avail themselves of it, because they will have to pay an extra duty for it, whereas they have always irrigated their fields *gratis* ; and considering their means and circumstances, it will be a great injustice if they are made to pay for *water*, which they are accustomed to receive free of all charges, and which when supplied from canal, is sure to prove injurious instead of beneficial to them. As regards the cheapness of Canal Irrigation as shown in Table N, appended to Mr. W. G. Wilson's printed note of 13th February, 1881, I beg to observe that, even granting the cheapness of canal as compared with well irrigation, this single consideration can by no means outweigh the most serious mischief to public health and to the soil, which Canal Irrigation has been shown to work.

Fifthly, canals may be a safe-guard against a drought or famine, but droughts and famines are of very rare occurrence, and their bad effects last only for a while, whereas canals, once opened, will be of permanent duration, and will continue to exercise their mischievous effects upon public health and the soil. Moreover, they will intesify the floods which frequently occur in Oudh. I cannot, therefore, recommend the adoption of a system which, might give us some relief during the short period of a drought, but which will be a perpetual source of mischief to us.

Having dealt with the first point, and shown the inadvisability of introducing Canal Irrigation in Oudh, I now turn to the second point, *i. e.*, "How and by what means Canal or Well Irrigation can be extended." In Oudh, land of every description is singularly adapted for sinking wells. In some districts we can have abundant water, by sinking a well only a few feet deep. Instances may be given of large fields being fully-irrigated with water from a small well in the neighbourhood. Well Irrigation is the mode of Irrigation which only may be adopted for all parts of the country with the greatest advantage to the Government and the people, and the least risk to both. Government may, with the assistance and co-operation of the landlords, have as many wells constructed in each village as the agricultural state of the locality may require. The cost of construction should be borne partly by Government and partly by the landlords and others possessing permanent rights in the soil.

Tanks and jhils, wherever they exist, may be utilized for the purposes of irrigation. They should be made deeper, that they may not soon dry up, and may contain a sufficient quantity of water to be used for irrigation at all times. The cost of enlargening and deepening these should likewise be born by the Government and landlords, and the former may recover its portion of the cost from the latter at the expiration of the present term of settlement, when the land revenues will have to be re-assessed. The cultivators and tenants should be exempted from contributing towards the construction of wells and enlargement of jhils and tanks.

In conclusion I beg to say that the above remarks involve the results of my personal experience, confirmed by the large and more varied experience of those who have made agriculture their profession, and that any scheme that has for its object the promotion of the agricultural interests of the province, will have my hearty support, provided it does not clash with other and more important interests.

I further beg to apologise for the unavoidable delay which has occurred in the submission of this statement, and which was due to the circumstances which I have stated in my private letter.

I have the honor to be,
Sir,
Your most obedient servant,
AMIR HUSAIN,
Rajah of Mahmudabad.

KUNWAR HARNAM SINGH'S PAPER ON IRRIGATION.

CANALS AND WELLS.

Canals and wells are the two most prominent irrigators of the soil, and have for some time past excited the warmest controversy, and have received the greatest attention, in preference to any other branch of agriculture. Their comparative merits have so often and so thoroughly been discussed, that almost every one seems familiarized with the advantages and the disadvantages of each. It is well known that canals require no draft animals, the water never fails, and that they are less expensive (particularly to cultivators) than wells; but that they bring out the sterile salts in some places, breed fever, and their water is cold and unfavorable to cultivation. They very often lay a deposit of sand on the soil and thereby injure it, and also over-flood fields. In regard to wells, it is held that the water will not deteriorate the soil, nor water-log fields, and never generate malaria. It is more suitable and convenient for irrigation than canal water; but at the same time considerable difficulties are experienced in sinking them—they run dry when water is most needed, and, on the whole, are more expensive (particularly to cultivators) than canals. The following extract from the report of the Assistant Engineer, Kappurthala Estates in Oudh, will give some idea of the difficulties experienced in sinking wells:—

"Well-sinking to any depth is unheard of in the villages of this district. I would not say that it has not been tried, but that the difficulties of proper sinking has been a deterrent for so long a period, that such sinking is now looked upon as an impossibility. No sufficiently continuous efforts have been made by men in power, or by private individuals, to overcome difficulties which are great though not insurmountable. An instance of this kind came to my notice at Ikaona

"A site, which appeared very suitable for a well, being selected, operations were begun. During the progress of the work I heard from the villagers that the old Raja, from whom the estate has been confiscated, had, shortly before the Mutiny, attempted to sink a well within about 200 yards of the site at which I was at work, but was obliged to abandon the attempt owing to the difficulties encountered. No sign of the well remains. His difficulties must have been met with in the first sinking, as, had any depth of water, at all worth speaking of, been obtained, the well would have been allowed to remain, if for no other but drinking purposes.

"My experience of sinking the well close by was one difficulty from beginning to end (total sinking 24 feet), and I am not surprised that the work was abandoned as impossible by the Raja. This is an instance within our knowledge of an attempt at well-sinking, with the result. Many more such before them must have been the cause of the prevalent opinion that it would be impossible to sink beyond a certain depth. Had the appliances which we possess been obtainable then, there can be no doubt that so great a desideratum as a good well would not have been left unprovided.

"A well in the district is thought sufficiently deeply sunk if, in the months of May and June, four or five feet of water remain in it. Though chiefly meant for drinking purposes, no small number of these brick wells of three or four feet diameter are similarly sunk for irrigation. They do a large amount of useful work, but the area which they can irrigate is so small, and the labor required to raise (by *dhenkli*) and distribute the water so great, that they will not bear a favorable comparison with wells of a larger diameter more fully sunk.

"Elsewhere, next to this small well, worked by the *dhenkli*, we have the larger bucket (*charsá*) well, and beyond this again, the Persian wheel well. These two sorts are not yet widely spread, except in a few districts. The *charsá* appears to obtain in the North-West Provinces and Oudh, while the Persian wheel is common in the Punjab. The *charsá* undoubtedly does more work than the Persian wheel, yet for this reason is it a severer test on the well, and, unless the well has a good foundation, the *charsá* is apt to cause sand to be thrown up so as to speedily choke the well. The action and discharge of the Persian wheel being distributed over a greater length of time, the head of water outside the well can never become as great as with the *charsá;* and I would say that generally where well-water has to be lifted from a sandy bed, the Persian wheel is the lifting machine which is least likely to disturb the foundations.

"To speak at any length of the different strata met with in sinking wells, would lead to confusion, and is perhaps unnecessary; general facts with the means employed to overcome the difficulties, are all that I should say here required.

"Well-sinking is more or less a speculation, there being no certainty of what the work will actually cost after the preliminary sinking. To ascertain the likely cost of a number of wells within an area of a few square miles, the nearest approximation will be obtained by actually sinking a well to examine thoroughly the strata to be dealt with. Failing this, enquiries must be made from old villagers as to the wells which have been previously sunk in the neighbourhood, however insufficient this sinking may have been; and to ascertain what is below the depth to which wells are actually sunk, boring must be resorted to. The latter, though not in every instance a certain guide, would generally give an idea of what is to be expected within a certain area of (say) six square miles.

"I am aware of differences of strata or sites within 500 yards of one another, yet I would not say that this is the general experience of the country. Tracts whose strata vary within short distances so markedly as to effect a considerable difference in the cost of wells, are the exceptions.

"I have found within an area of three square miles, in which eight wells were sunk, that the strata of no two were alike, although a group of three in one place, and two others in another, were near one another. These eight wells were, with one exception, difficult to sink. Days frequently elapsed without their sinking an inch through strata on which a dredger made no impression, and with which the *jham* could do very little. The one exception of easy sinking

was the only well of these eight in which for the 21 feet to which the well was sunk sand only was met with, sparingly interspersed with a sandstone formation. The other seven varied in strata one from another. Beginning with clay, a layer of three or four feet of sand, thickly interspersed with large slabs of a recent sandstone formation, would follow; after which clay would again be met with of a light colour, embedding a hard *kankar*, such as that used in roads; this again was followed by a tenacious sand, into which the dredger would not sink, and which had to be cut through by the *jham*, worked (rather driven) by a rule above the water surface. The latter is about the most tedious operation, and the most unsatisfactory that can be imagined—a few *jhams* full of stuff being the result of as many half hours work, if the *jhams* are not broken in hauling them up after sinking.

" One well, beginning almost immediately in this tenacious sand, got into a bed of large nodules of sandstone, extremely hard to break up. This stone, at first imbedded in sand in detached nodules, increased in size as the sinking progressed. Large blocks were broken off by iron bars with chisel, and worked from above the water surface, and then brought up with ropes passed through some of the holes. Dredger and *jham* were quite useless. This bed had a depth of about 13 feet, and was followed by sand, and not by clay, as was hoped from the experience of other wells.

" One well has this sandstone in hard rock like nodules, while another contains the same sandstone in large slabs. One slab taken out of one of these wells, from a depth of 18 feet of water, was 4½ feet by 2 feet by several inches in thickness. The stone is similar to those found in the ravines of the *tarai* to the north.

" Another group of six wells, five miles distant, did not offer such a variety of strata, clay being met with in one case only, while the other contained sand and the sandstone (spoken of above, though not in such sizes), the latter being found in greater or less quantities, and at different depths. The clay met with was at a depth of about ten feet below water surface, and was followed by a fine sand, which continued for the rest of the depth to which the well was sunk, *i. e.*, 25 feet. This well has so far proved a failure. On being worked sand has been thrown up the cylinder to a considerable height, practically running the well dry. The other five, sunk to a bed of coarse bluish-grey sand, do not appear to be effected. These six wells are in a length of two miles.

" Another group of seven wells has afforded a strange experience. Water-level in wells in this tract is at a depth of ten feet below the surface, and no ordinary *chaora*, with sides supported by pegged-down lengths of *dal*-plant stalks tightly bound together, will stand. It was concluded that nothing but sand was likely to be met with, while it was considered certain that the supply of water would be unlimited. It was then a matter of no small surprise when, after piercing with a cylinder of masonry through six feet only, during which the well could with some difficulty be kept dry, a stiff clay was met with, which, when cut into, spirt out all water, the accumulations of the night being drawn within an hour by one or two *charsas*, worked by men, the following morning.

Sinking through this clay continued for a depth of from ten to twelve feet, when a spring of water was tapped, which no amount of plugging could keep down, and which rapidly filled the well to percolation level, precluding all further dry sinking. This spring of water not proving sufficiently strong, the water being reduced to within five or six feet of the curb, by men running with *charsas*, a further sinking of seven feet was generally necessary, when the supply of water was good. For this last sinking the cost trebles and quadruples the previous cost. Among these seven wells, one sunk 33 feet is still in clay, and can be dried by two *charsas* in two or three hours No sign yet of the spring which broke out earlier in the other wells.

"Yet this group of eight wells may be said to be generally the same sort of work. The first sinking through a watery stratum of fine sand and clay, then through a layer of stiff dark clay, till a spring is tapped, after which further sinking for a depth of about seven feet is necessary, till a layer of coarse sand, which underlies the clay, and appears to be the true reservoir, is reached.

"Financially, I would not say that the wells sunk are as yet a success, though I have no doubt that they will eventually come to be so."

And here I may be allowed to remark that, whatever be the comparative merits of canals and wells, it would be anything but wise to give a universal predominance to one or the other. Nor should the humbler means of irrigation be entirely neglected There are many, I hope, who think with me that the requirements of each district should be consulted, through the district officials, and the natural facilities that it affords be availed of. Let wells be sunk where wells will serve the purpose; let irrigation works from dams on rivers take the place of wells, where most convenient; let water be stored up in the form of *jheels* or tanks, by draining off the surrounding plains, where practicable and safe; and let canals run where the natural features of the place call for canal irrigation and no other. We should not also lose sight of the financial aspect of the question. There are tracts of land in which well-sinking would be too expensive, and not pay even 4 per cent. on the outlay. It would, therefore, be hardly worth while attempting such a thing. There are, again, other soils that require no artificial irrigation, except in seasons of drought. Wells sunk in these would cost (say) not less than Rs. 300 each. A common tenant, or land-holder, could never get the sum at a less interest than Rs. 24 per cent. per annum. Calculating the simple interest on the sum for five years, it would amount to Rs. 360, exceeding even the principal. Now, if the season of drought were supposed to recur every five years, it could not be expected that the profits gained by well-irrigation would help the tenant to pay off the principal as well as interest, besides meeting other demands upon him, during that term. But if Government undertake the task, it would be well to take the views of those for whose benefit the work might be intended. The good of it would be that they would more readily coöperate with Government, and more cheerfully bear the whole or a part of the cost, than if they had no voice in the matter.

COMPARATIVE MERITS OF CANAL AND WELL-IRRIGATION.

THERE has been great discussions about the comparative merits of canal and well-irrigation. The paper drawn up by Mr. Wilson gives the comparative cost of both methods of irrigation, but he has not touched on the relative merits, *i.e.*, the benefits or injuries resulting from either method: and I think I cannot do better than place before you the opinions of two very experienced officers, Messrs. Buck and Crosthwaite, on the subject. I also add what was my opinion as a settlement officer, and I may state that I have seen no cause to alter the opinion then expressed.

Extract from a letter from E. C. BUCK, ESQ., *Officiating Secretary to Board of Revenue, to the Secretary to Government, North-Western Provinces, No.* 283A., *dated the* 17*th March*, 1874, *forwarding report on the settlement of the Meerut district.*

It is certain that the introduction of canal-irrigation has given a great impulse to cultivation and production in the district. Mr. Porter remarks in Kithore on the improvement effected by it in sugar cultivation; and Mr. Forbes attributes the improvement of the agricultural condition of the Gujar tract on the Loni slope to the civilizing effect of the canal. He notices, too, a remarkable instance of its influence in the pargana of Burnawa, where, in the dry year of 1869, he found the cultivators of the north section, from which canals are excluded, selling their sugar-mills to the cultivators of the south section, which is plentifully watered by canals. This fact speaks for itself.

It is, no doubt, greatly in favour of the immediate success of a canal that it should enter into a thickly-populated country, where a large supply of manure may cope with the exhausting powers of a practically unlimited water-supply, and where there is sufficient labour available for its utilization. The density of the population in the best parts of the Meerut district is large. In Baroto the number of inhabitants per cultivated square mile is no less than 944, and in such tracts, heavily-manured as they must be, it is almost impossible that too much water can be given. Where, on the other hand, the population is more scanty, the improved facility of irrigation will admit of its gradual increase; but, meanwhile, it is possible that an excessive supply of water may cause the temporary exhaustion of the irrigated area.

There is no doubt that there has been an extensive increase in the irrigated acres since last settlement, which is said to have increased from 232,949 to 578,512 acres, and though (as Mr. A. Colvin remarks, in his memo. on settlement in the North-Western Provinces) these figures must be received with caution, yet the fact of a very large increase in the irrigated area cannot be doubted. The increase in cultivation is also due, in some measure, to the same cause. The western canal had not been long opened when Sir H. Elliot remarked that already it had caused all the waste in the neighbourhood to be reclaimed, and the same influence may be attributed to the extension of canal-irrigation in other parts of the district.

Amid all the improvements acknowledged to have been wrought by the canal one charge has been brought against it of a serious character, to which reference has already been made. Mr. Forbes complains, in Chaprauli, that the uncertainty of the water-supply is so great an evil that he cannot but regret the substitution of canals for wells. In Bhágpat he is inclined to think irrigation is excessive, and, if that is the case, it seems a pity that the water-supply should not be kept within more confined but less uncertain limits.

Another complaint made by Mr. Porter, in Sardhana, is that individual villages have suffered in consequence of the vicinity of the canal, which, while throwing down

their wells by raising the water level, has not compensated them with a supply of water equal to that which they have lost.

Some allusions are also made to the obstructions caused by canal watercourses to the natural drainage of the country.

It is satisfactory to find that the evils of which complaints are made are of such a nature that it lies within the power of Government either greatly to alleviate or entirely to remove them. Steps have already been taken to provide against the obstruction to prainage in some parts of the district, and Rs. 20,000 were granted at the commencement of the present year (1873) for a drainage cut in the Chaprauli pargana.

Extract from the report on the settlement of the Etáwah district, by
C. H. T. Crosthwaite, Esq., C. S.

I here give (see appendix) statements, compiled from returns kindly furnished to me by the canal officer, which show the progress of canal irrigation in the district. For the years between 1862-63 and 1868-69 the crop statistics are not forthcoming.

The irrigation from the Etáwah branch has increased 203·09 per cent. during ten years. It took a great leap in 1868-69 owing to the drought of that year, and although it fell considerably afterwards, it remained nearly double what it had been before; and in 1872-73 it again went up almost to the same number of acres as in 1868-69. In fact there was a far larger area irrigated in the rabi of 1872-73 than in the rabi of 1868-69. The points in these statistics most worthy of remark are the following:—

(1) That the drought gave a permanent stimulus to irrigation.

(2) That the falling off in irrigation after the drought was chiefly confined to the cotton and ordinary kharíf crops, those which, in ordinary years, do not need and would not benefit by irrigation.

(3) That the area under indigo is rapidly widening.

The increase in the area under sugar irrigated from the canal is also very marked. All these are signs of permanent benefit, in so far as the canal water has not been substituted for well-irrigation.

In the matter of indigo, this is not the case. The growth of that plant must be ascribed entirely to the canal. Thus, in Phaphúnd, in the year when it was surveyed, there were only 537 acres under indigo on the canal books. In 1872-73 there were 3,331 acres, and in Bidhuna and Bharthna there has also been a large increase.

The disadvantages and advantages of canal-irrigation have been repeatedly discussed, and there is not much more to be said about the matter. After all, the statistics I have given are real practical solution of the question. If the cultivators go on taking the water and increasing the area under canal-irrigation year by year, it is imposible to suppose that they do not largely benefit by it. However, in a report of this nature it is hardly possible to pass the question over in silence, and therefore a few remarks will be made concerning it.

I take up first the disadvantages, real or alleged, of canal-irrigation.

The people have several complaints against the canal. Leaving out the annoyances arising from maladministration, which vary very much with the characters of the district canal officers, they complain, first, of the uncertain supply and the impossibility of getting water exactly when they want it; secondly, of the inferiority of the water as a fertilising agent, caused, they allege, by its coldness; thirdly, of the deposit of silt and reh and the deterioration of soil consequent thereon.

The complaint of uncertainty both in the time and quantity of the supply is universal. Even on the Eastern Jumna Canal, the management of which is as perfect as it can be, I have seen Jats making masonry wells in land irrigated from the canal.

And they told me they did so, not with any intention of leaving the canal, but simply in order to have another string to their bow. All irrigated crops, but specially tobacco, opium, and sugar, and vegetables of all kinds, require to be carefully watched and to have the water applied exactly when they want it. The delay of a day or two may cause a very serious loss in the produce. Such delays must occur owing to the measures necessary for the distribution of water on a large canal, as well as through accidents.

Then, again, as to the supply, nothing can exceed the devotion of the canal officers, and everything that industry and forethought can do, is done by them. Still accidents will happen. From an accident in the upper part of the canal, the supply during one year I was at Etáwah was so short that the water had to be carefully nursed and lifted with much difficulty, and a large area of land intended for indigo remained unsown. For this reason Kachhis always prefer wells, if they can get them, for their garden cultivation, and wells are found working in the gauhan lands of villages which could be irrigated flush from the canal. The officers of the Opium Department prefer, I believe, well to canal water for poppy cultivation. They do so simply because they get better opium from well land. The cause, however, is not any peculiar ingredient in well water, but the timely supply of it to the crop.

The inferiority of the water as a fertilising agent.—The water is everywhere alleged to be colder than well water, and, of course, every one knows that in the cold season the water in a well is higher in temperature than the exposed water of a river or canal. But I do not believe that this coldness affects the produce. My reasons are, firstly, that the accusation is not brought against the water of jhíls and rivers that are used for irrigation, and must be equally cold. The streams used to irrigate the Bhábar, for instance, must be colder than any water that reaches us here ; yet it does not seem that any injury has been caused there.

Secondly, the crops produced by canal water are admitted in the first years to be very large. But it is not pretended that the water is higher in temperature in the first years of its use.

If there is any inferiority in canal water it is not due to its coldness.

Is there, then, any inferiority ? My own experience is that, where the farming is good, canal crops are quite as good as well crops. They suffer sometimes from delay in getting water. But this apart, the produce of good irrigated dumat, whether from wells or canal, runs from 9 cwt. to 14 cwt per acre of wheat in this district.

Still, it is universally asserted in Etáwah that after the first two or three years the crops do fall off ; and this is, I think, true. Wells require a large live-stock and great labour. The soil reaps two benefits from this ; there is more manure saved from burning, and the tendency to overfarm is checked. If the farmer has to work at his well, he cannot sow more sugar or wheat than he has time to irrigate. But when he is relieved from all well duty, he has nothing to keep him within bounds. He sows more of these crops, and at the same time he has less manure. I believe this is the true reason why crops in canal land show a tendency to deteriorate ; a result attributed by the people to the quality of the water.

It may be said against this that Mr. Buck (in his valuable paper on canal-irrigation) did not find that the cattle were materially reduced since the advent of the canal. But it will be noted that Mr. Buck qualifies his assertion by the word *materially.* I cannot pretend to the systematic enquiries made by Mr. Buck. But my experience (and Mr. McConaghy says the same) is that wherever wells have been largely used, wherever, that is, bullocks have been kept for irrigation, the substitution of canal water does reduce the number of cattle. That it extends the area of crops that need manure is admitted by everybody.

I believe, therefore, that the above explanation of the deterioration of the crops after the first years of canal-irrigation is the true one. And, it should be added, that the manure is not only diminished in quantity, but in quality.

The cattle used for irrigation must be highly fed, and their dung is worth far more than that of the lean bullocks that pick up a scanty living in usar plains.

In some villages there are large numbers of cattle kept for carts, and the cultivators ply a carrying trade in the intervals of agriculture. In such places the number of cattle is not affected by the canal. But in purely agricultural villages, I believe the number and quality of the cattle are generally diminished.

The question as to how far the deterioration of crops proceeds is a difficult one. I believe it does not go beyond a certain limit, and that it is greatly exaggerated. It is also a deterioration or falling off, not so much with regard to the average yield of crops irrigated by other means, as to the extraordinarily large produce of the first years of canal-irrigation. There is no doubt water acts like a stimulant. It calls forth all the powers of the soil. But if it is not backed up by a due supply of other food, it leaves exhaustion behind it.

It has been asserted that canal water is wanting in necessary qualities as a fertiliser. But what is canal water? It has no distinct nature of its own. It is the water either of the Jumna or the Ganges. Now, when these rivers flood their banks, the result is generally a soil second to none in the world. And why the water should acquire an opposite quality by being conveyed a few miles in a canal needs to be explained.

The rivers themselves sometimes have a deposit of sand on the lands flooded by them. The same thing has, no doubt, occurred from canal-irrigation. But I have never, I must confess, seen a village that was so injured. Injury from reh is much less frequent than is sometimes asserted.

If one village is injured from reh, the people talk of it, and raise a clamour about it, till others think that the whole pargana is ruined. When settlement is in progress the cry of reh is raised from every canal village. I only know of two or three villages where, owing to the stoppage of the drainage, reh has accumulated so as to infect the cultivated land. And in these, although the outcry is great, the land is cultivated and the same rent paid as heretofore. But in these villages reh was always present in the soil. Canal water never creates or produces reh where it did not exist before.

Owing to faults in the primary construction of the canal, injury from swamping is much more common than it ought to be. A canal need not run across all the lines of drainage, and where it is necessary that it should do so, it is easy to provide sufficient waterway. Where injury has been done, it should be remedied by drainage. The worst cases of swamping in this district are to be found about Kundhon and Kumara in the Phaphúnd pargana. The land has been carefully surveyed, and a proposal for drainage works has been sent up by the Executive Engineer. I have now, I think, stated nearly all the drawbacks to the canal. The greatest of them is its uncertainty, and that, fortunately, is the fault most under our control.

But the value of the objections raised against the irrigation is shown by the eagerness with which the people abandon their wells wherever they can get canal water without unreasonable labour. Except in one or two cases, where the fines inflicted for breach of canal rules have disgusted them, and in the case of market garden cultivation, I know of no instance where the cultivators do not avail themselves of canal water. Where some little expenditure is required to bring in the water, zamindars sometimes, hang back until the settlement is over. But such cases are rare. The call for water is constant. Where irrigation once begins in a village it generally increases yearly. Their debt to the canal in seasons of drought is freely acknowledged by the people, and their universal readiness to take the water may be accepted as a sign that the real drawbacks to its use are small.

When canal water is taken into dry land, the effect is (1) to increase the area under the rabi crops ; (2) to introduce, or, at any rate, largely stimulate, the growth of wheat; (3) to introduce sugar ; (4) to diminish the area under barley, chana, and cotton. Many villages now irrigated from the canal had formerly little or no irrigation from wells, and the result is simply to put them on a level with villages that have the best well capability.

An ideal canal should, in my opinion, give its water only to dry tracts. The advantages accruing from it would then be greatest.

This principle, however, has been much neglected, and it is sometimes practically impossible to follow it. The result is that wells are superseded by canal-irrigation. The most marked change produced in consequence is the extension of the areas under sugar and indigo.

As to the comparative cost of well and canal-irrigation, I do not think any arithmetical calculation, however ingenious, can be made with any practical result. The great relief from labour given by the canal probably goes as far as anything else with the ordinary peasant in directing his choice when it is possible for him to choose. When a man has no sons or male relatives to help him, or when he has had to keep more bullocks for irrigation then he wants for his plough, he may realise to himself that he actually saves money by employing the canal. Ordinarily, however, it strikes him the other way. The expense of well-irrigation is disbursed by degrees, and consists largely of the consumption of the cultivator's own produce. The canal rate has to be paid in cash and in a lump sum, and by a stated time ; and the collection of it is attended by all the annoyances of a tax. To the average cultivator the canal appears an expensive business, more costly than his well. But he is saved from an infinity of toil, and can irrigate a much larger area of land ; and those, I believe, are the reasons that sway him.

When he has once taken the water and become accustomed to it, it would take some very powerful cause to induce him to return to his wells, if that were possible. The canal rates might be raised so as to exceed the actual cost of well-irrigation without having that effect, provided any margin of profit was left. Judging from the cost of lift-irrigation, which is taken quite as readily as flush, the rates for flush-irrigation might perhaps be raised. But it should be done tentatively and by slow degrees, if it is done at all. No calculation, however elaborate and apparently correct, should be followed. Even if it were possible to calculate exactly the cost of the labour used in well and lift-irrigation, much would not be gained. If the cold weather rains fall, perhaps only one water may be necessary, and the greater portion of the cost of the labour will be saved in the case of well and lift-irrigation. But if one water has been taken, the whole of the cost of flush-irrigation will have to be paid whether more is wanted or not, for the labour saved in that case is insignificant. Besides, it must always be remembered that the higher the rate is, the more will the cultivators hold back in the hope of getting rain. As it is, they often do not take the water until some damage to the crop has been done: and they are then sometimes saved from the necessity of taking it at all by the fall of rain. To raise the rate will be to increase their tendency to delay, and often a great loss of produce might ensue,—a loss to the whole country as well as to the canal.

Extract from the report of the settlement of the Cawnpore district, by F. N. WRIGHT, ESQ., C.S., *chapter III.*

In the first pargana which came under inspection, the Non-Pándu Doab of pargana Shiurajpur, I was met with the following charges against the canal :—

1. Destruction of wells ;
2. Deterioration of the soil ;

3. Encouragement to the growth of grass and weeds;

4. Decreased produce.

These I separately investigated and disposed of as follows :—

1st, wells were undoubtedly thrown up by cultivators on obtaining canal water, but where it suited them to keep them up, as for vegetables, they could be and were kept up. The severe rains (and perhaps approach of settlement operations) had caused the destruction of numberless unbricked wells, not only where the canal was at work but elsewhere ; *2nd*, the " chill " to the soil was due to the unintelligent use of the water, which was splashed over roads and waste places, and undoubtedly tended to waterlog the soil. The question of " reh " had not yet been thoroughly investigated ;* *3rd*, the growth of weeds and grass was chiefly due to heavy rains which had not admitted of the land being properly cleared ; *4th*, the decrease in outturn was simply due to the exhaustion of the soil resulting from over-cropping, and insufficient application of manure to restore the plant-food taken out of it.†

Thus the first charges were easily disposed of and in favor of the canal. The gravest charge, that of obstruction of drainage, was not so easily disposed of, and occupied our attention throughout the whole of our work. Whenever an instance of injury resulting from obstruction of natural drainage came to our notice, information was immediately conveyed to the canal officers, who, I record with much gratitude, have always afforded our representations the fullest attention, and, as far as possible, I believe, given effect to them.

Extracts from the Cawnpore agricultural memo., by F. N. WRIGHT, ESQ., C.S., *paras.* 51 *and* 52.

The comparative value of canal and well-irrigation is a question that has received as much attention as any other in Indian agriculture, but I do not know that any certain result has been arrived at by experiment. Nor, indeed, do I believe that any hard-and-fast rule can be laid down in matters which contain so many points of variation. Complaints are rife against canal water, chiefly pointing to one main result—decrease in the productive power of the land so treated. From the first I gave much consideration to these complaints, and I cannot do better than quote my Shiurájpur report on the conclusion at which I arrived :—

" The complaints invariably made by the peasantry against the canal are—(1) that it destroys wells; (2) that it chills the ground; (3) that it encourages a strong growth of grass ; (4) that it does not produce a similar outturn to well-irrigation.

" (1) The first complaint is easily met by the fact that where it pays to keep upon non-masonry wells, as for vegetables, &c., they are always kept up, and that though it is undeniable that the filtration does tend to make the wells less durable, the argument is really one *post hoc, ergo propter hoc :* the ryots have failed to keep up their wells, and therefore attribute their destruction to the cause that has led to their disuse. It is a question, too, to what distance this filtration affects the subsoil. I have seen wells quite close to a canal working away merrily, and I have seen old masonry wells at a considerable distance from the canal said to have had the water level raised in them by it. Again, the constant rain of the last three years has indubitably raised the water level, and wells now fall in the sandy substratum which is above the brushwood binders, and which commencement of percolation formerly did not reach.

" (2) The second argument is so far tenable as that, in certain places readily recognizable, and for which allowance is readily made, the ground has become soppy,

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* I can add nothing to the information given in Mr. Buck's paper on reh.

† Indirectly, too, the canal did injury by taking up for its main channel or distributaries the best land in a village. In the latter case, as to a certain extent avoidable, the attention of canal officers was invited to the advisability of not taking distributaries through gauháns, which, in spite of the temptation offered by the most remunerative crops being grown in those lands and paying higher water-rates, they promised to, as far as possible, avoid in aligning distributaries.

and, indeed, unculturable. I confess, too, that I consider the extravagant use of canal water, especially when obtainable flush, so different from the careful distribution of well water, where every drop is prized, has a great effect on the land, which I am not scientific enough to call by any other name than chilling:—Experience is doing much to counteract these effects; the water is more sparingly applied; and I have one instance of a ryots endeavouring to restore the original condit on of his land by allowing it to remain fallow.

"(3) This complaint is based on entirely false grounds. I admit being much misled by it at first. In my earlier village notes I have many hesitating admissions of strong growth of grass. Subsequent experience, confirmed by admission of more intelligent cultivators, however, has taught that it is solely due to the constant and incessant rain, especially last year, which did not admit even of the hot months killing off the weeds, and they therefore getting head, conquered the plough bullocks, and ultimately led to much land being left fallow in the poorer villages, where cattle were scarce or poor, and money to pay hand-weeders was not forthcoming.

"(4) This objection can only be satisfactorily proved or disproved by a long course of experiment. For two years the accuracy of experiments made with the express object of comparing the outturn from well and canal-irrigation has been disturbed by the otherwise opportune rains of the cold season. It is at all times difficult to obtain such specimens as, by the removal of inequalities, admit of exact comparison; and this year was especially unfortunate, as many of the villages which use canal water had taken one watering, when the rain fell, and the excessive moisture thus induced encouraged the rust which in the weaker crops did so much mischief during the long-continued fogs of the earlier part of January.

"That this objection loses all its force when properly met, is amply proved by the circumstances of the village Mustah. This village, densely populated with *Kurmis*, is cultivated nearly throughout its entire area like a garden. It is watered throughout from canal, and the finest crops are grown all over it. More than this, its rent-rates, nearly the highest in the pargana, date, according to the unanimous voice of the residents, from the introduction of the canal. They have found, as they have it at hand, the greatest antidote for deteriorating effects (if any) of canal-water,—manure. Wherever manure reaches, the crops are as fine as those irrigated from wells. As, however, the manured area only forms but 28 per cent. of the whole, the question resolves itself into the simple form of manure supply."

Further experience has in no way altered the opinion therein arrived at, which I may condense into one assertion, *viz.*, that any injury resulting from canal-irrigation is positively and entirely the fault of the cultivator. He swamps his land, making a very quagmire of it; he double-crops and takes out all the soil can give with little or no return; he slops and wastes the water about roads and waste patches; and, if there is "reh" in the soil, he will not protect his fields by a little bank against the inevitable introduction of the defertilising salt, and then complains of decreasing fertility, sickness, &c., &c. I can only say what has been said by higher authority than my own—"he must learn." When he takes just so much water as he wants, hoards it, and doles it out as he does his precious well water, saves his farm manure, or begins to employ substitutes (as is already the practice in some places, by using the refuse of indigo vats), we shall hear no more of the injuries from canal-irrigation, but its undoubted cheapness will make it a benefit not to be measured only by its value as a protection against famine.

We have here the chief faults of canal-irrigation prominently brought forward: and I think, too, the manner in which those faults can be remedied. It is a difficult question for any one to decide outright whether canal-irrigation is good or bad for a given tract of country, but we have strong *à priori* evidence of the good that results from its introduction. Do the injuiries outweigh the benefits: or are they

not rather such as can be remedied ? I assume that the earnest wish of all is the *common* good ; that no selfish interest is allowed to stand in the way of what will benefit another. But in this matter the interests of landlord and tenant should be identical; both profit : the landlord gets his rent payed with regularity, he has a prosperous and contented tenantry : the tenant is never in fear lest his crop should perish ; years of drought have no terrors for him ; any harm he may suffer is due to his own fault or ignorance : and both these sources of injury can be removed. It is a question, of course, whether canals should be taken to tracts of country thoroughly protected by well-irrigation. If canal water is only to be a protection against drought, it may be taken everywhere where the physical characterstics of the country admit of it ; but, undoubtedly, canals should be taken just where there is no possibility of an effective supply of water from wells. If there exists any tract where there are no wells and no possibility of making them, take the canal there without hesitation. But there are tracts where a certain proportion of irrigation from well is possible, and there it is a matter of much greater difficulty to decide whether a canal is wanted. There is a third class of country, where canal cannot possibily go, but where the *existing* irrigation from well is inadequate to the protection of a sufficient area from drought. It is in regard to these that a few words may be allowed regarding the action which should be taken to effectually secure such a tract, and ensure such an area being cultivated under food-grains as will support the whole population for a certain number of months. Now, wells can be built by private enterprise or by the Government ; and in the case of private enterprise, by the landlord or his tenant ; and from his own resources or on an advance made by Government. Which of these courses recommends itself to you ? I find by experience that much can be done by the landlord and the tenant too, by a thoroughly-worked system of takávi advances : if takavi is readily obtained ; if payment is allowed on easy terms ; if there is very little tahkikats, and prompt payment of the advance, considerable sums will be taken every year and be well laid out on wells. As a rule, the tenant cannot afford to build from his own resources, and he has very doubtful security to offer for an advance made by Government. It is then the duty of the landlord to do what the tenant is unable to do : it is his duty to take such steps as will protect the land for the revenue of which he is responsible, as will place it beyond the fear of such injury from drought that the whole community suffers from its disastrous condition. The landlord can give security, he has the command of labour and fuel, he has no one's permission to ask to build a well on his own zamindari. I admit he cannot do much in a given time, fuel is scarce and labour not forthcoming : his progress, therefore, is very gradual; but where it is honestly carried out there it is evident the Government need not interfere. But if he won't take such measures as are consistent with his duties as a landlord, or as a member of a large inter-depending community, it is the duty of the Government to step in and take such measures as it may think advisable to ensure the payment of its own revenue, but far more to protect its subjects from the disastrous effects of drought. The question is still before the Government of these Provinces in what way this action of the State can be best initiated. Experiments have been, or are being, carried out by myself in Cawnpore, and another officer in Moradabad, with the object of throwing light on this important subject. It would be inconsistent with my position as a Government official were I to urge my opinions on you whilst the matter is still under discussion. But I have written a report on the subject, which may possibly be available to those who wish to see the subject treated so far as my experiments have led me, and I shall at all times be most glad to discuss the whole question, with those interested in it, privately.

NOTE ON THE COST OF IRRIGATION FROM VARIOUS SOURCES.

THIS note is based partly on measurements made during the last twelve months, and partly on data given in Settlement Reports.

2. The results obtained are not strictly true for the whole province. The cost of well-irrigation depends greatly on the facilities that exist for making the wells. In some places *kacha* wells can be made for a few rupees, which, with very little protection and repairs, will give a good supply of water for 10 or 20 years. In other places *kacha* wells cannot be made at all, or, if made, give sufficient water to supply only one *dhenkli* each. The cost of *pakka* wells, too, varies greatly in different parts of the provinces.

Again, the rates for labor vary considerably. In the Cawnpore district Mr. Wright states that the men working a basket-lift get two annas cash and ¼ pice *chabena* each per diem. In the report on the settlement of the Azamgarh district the wages for a full day's work of the same kind are given as equivalent to one anna two pies of standard currency. I have assumed a day's wages to be two annas.

The general rate for hiring bullocks is eight annas a pair per diem. But as a cultivator probably regulates the number of his bullocks by the area to be ploughed, I have allowed only three annas a pair, which is about the cost of their keep when in hard work.

3. Table I. gives the cost of raising water by various water-lifts. The data from which it has been prepared are given in the following paragraphs.

No allowance has been made for the men employed in the distribution on the field, as this varies with the number of men and cattle employed to raise the water. For instance, one man is required to look after the distribution in the field, whether three men working one basket at a 3-feet lift, or 12 men working four baskets at the same lift, are employed to raise the water.

The labor employed in digging the watercourses and in dividing the fields into kyaries has not been allowed for, as this expenditure is common to all systems of irrigation.

4. The area irrigable from a well in one year is calculated by assuming that a field requires one watering in 35 days during the cold season, and in 20 days during the hot season ; thus, if one acre can be irrigated in one day, 35 acres can be irrigated in the rabi, 20 acres in the kharíf, or 55 acres during the year.

5. The basket or *beri* used in Cawnpore-Farukhabad, and the eastern part of these provinces, is made of bamboo matting and costs about two annas. That used in Aligarh and Meerut (called *boka*) is made of leather, and costs four to six annas. The height of lift is sometimes 6 feet. Three men are usually employed at each basket, one resting while the other two work.

When the height of lift is 3 feet, six men working two baskets can irrigate from ⅞ to 1¼ acres in a day, according to the soil and distance from lift of the fields watered.

When the height of lift is 5 feet, six men can irrigate about ½ an acre a day.

6. A *dhenkli* or lever-lift costs about eight annas.

The rope costs four annas.

The earthen pots (*karwara*) cost 1 anna each.

Four of these are allowed for use in one year.

This lift is chiefly used in low lands, where the water level is within 15 feet of the surface.

A *kacha* well that will supply sufficient water for one *dhenkli* can usually be made for from Re. 1-4-0 to Rs. 2-0-0. Such wells generally fall in during the rainy season and must be renewed every year.

The maximum area irrigable by two men working one *dhenkli* alternately throughout the day is ⅛ acre.

7. In calculating the cost of lifting water by *lao* and *charas* I have assumed that *pakka* wells for two buckets are used, and have allowed 10 per cent. per annum to cover interest charges and repairs. If *kacha* wells are used, the annual charges will seldom be less than those for the masonry wells, as the former will require more expenditure on repairs.

The bucket (*charas, moth, pur*) costs from Rs. 3-0-9 to Rs. 4-0-0, and lasts two years.

The rope (*lao, birt*) costs from Rs. 1-0-0 to Rs. 2-0-0, and lasts one year.

Hence the annual charge on account of one bucket and rope is from Rs. 2-8-0 to Rs. 4-0 0.

The area irrigated by one bucket in one day when the height of lift is from 20 to 40 feet varies $\frac{1}{6}$ to $\frac{1}{8}$ acre.

8. In Bareilly, Azamgarh and Oudh men are sometimes used to work the *lao* instead of cattle. They usually work in gangs of 9 or 10, one at the bucket, 4 to 6 working, and the remainder as a relief. They are said to irrigate $\frac{1}{2}$ acre a day when the height of lift is 20 feet; at this rate the area irrigable from a two-lao well should be about 55 acres. Mr. Moens, writing of the Bareilly district, states that "this method is said to be cheaper and quicker in the long run, where labor rates are low, and frequent irrigation is not required, than keeping an extra stock of cattle for the purpose, where green crops are not much grown, and there is little or no available waste land for grazing."

9. If the height of lift does not exceed 20 feet, chain pumps may be economically used for raising water. The well may be 3 feet in diameter, its cost is estimated at Rs. 100.

A chain pump can be obtained at the Canal Foundry, Roorkee, for about Rs. 80. Allowing 10 per cent. to cover interest charges and repairs, the annual charge will be Rs. 8. Cheaper pumps can be made, but as their parts will require more frequent renewal, the annual charges will be about the same.

When the height of lift is 20 feet, one pump worked by 4 men will irrigate about $\frac{1}{4}$ acre in a day. The area irrigable in one year will be about 18 acres.

10. Table II. gives the total cost of one or more waterings, including the proportionate cost of well and water-lift. If a less area than that estimated be irrigated from the well during a year, the proportionate cost of well and water-lift per acre irrigated will be greater.

11. Table III. gives the rates for flow-irrigation now prevailing on the canals of these provinces.

The number of waterings required to bring each crop to maturity varies with the seasons. Sugarcane generally requires one watering in February or March before sowing, from April to June two waterings. If the rains are favorable another watering in November may suffice to bring the crop to maturity. But if the rains fail, from three to five additional waterings are required between July and October.

Rabi crops and indigo require from 2 to 4 waterings.

12. In flush-irrigation from the canal it is generally necessary to employ one or two men to watch the watercourse to prevent leakage, in addition to the men distributing the water on the field. To cover this two annas per acre may be allowed.

13. In Table IV. the cost of irrigating sugarcane, indigo, and rabi crops from the canal is compared with the cost of well-irrigation from a depth of 20 feet, the water being lifted by means of a chain-pump, the cheapest of the three methods given in Table I. for raising water from this depth.

14. Objections are frequently made to calculations such as the above, on the ground that the work of raising water is greatly done by the cultivator of the field and his relations, while he must keep his bullocks for ploughing.

The only experiments that I know of bearing on this point were made by Mr. Buck in pargana Tirwa, zila Farukhabad. He found that out of 804 men employed working basket-lifts, 224 were owners of fields or their relations, 72 were "jeetas," and 509 regularly-hired laborers. These figures give—

28 per cent. of home laborers.
63 ,, of hired ,,
9 ,, "jeetas."

(A "jeeta" is a man who gives labor in exchange for similar labor given to him on another occasion.)

Mr. Buck has also shown the value of the home labor liberated by the substitution of canal for well-irrigation. In November sugarcane frequently requires watering while the rabi sowings are in progress. During the months of December, January, and February the rabi crops require irrigation, and in a sugarcane district "kolus" are also at work. If bullocks are not required to lift water a much larger area of sugarcane may be grown. Mr. Moens states that in the Bareilly district men are frequently employed to work the "laos" when the plough cattle are being utilised at the sugar-mills.

Again, in April and May a larger area of indigo may be sown if the bullocks are not required to irrigate the sugarcane.

The rate allowed for a pair of bullocks, *viz.*, three annas a day, is about the cost of their keep when in hard work. If extra cattle are kept for well-irrigation, a higher rate should be allowed. When not at work cattle are turned out to graze and the cost of their keep is reduced. The life of a bullock in a canal-irrigated village is probably greater than in a well-irrigated village where he is worked much harder.

W. J. WILSON,
Assistant Engineer.

13*th February*, 1881.

TABLE I.

Showing cost of obtaining water from various sources.

Source of irrigation.	Kind of water-lift used.	Height of lift.	Area irrigated in one year.	Cost of well.			Cost of water-lift.			Labor employed.		Cost of labor per diem.	Area irrigated in one day.	Cost of labor in irrigating one acre.	Remarks.
				Total cost.	Annual cost.	Annual cost per acre.	Total cost.	Annual cost.	Annual cost per acre.	Men.	Bullocks.				
		Feet.	Acre.	Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.			Rs. a. p.	Acre.	Rs. a. p.	
Jhíl, tank, or stream ...	Basket ...	3	28	...	...	...	0 4 0	0 4 0	In appreciable.	3	...	0 6 0	⅛	0 12 0	
Ditto ditto ...	Ditto ...	5	14	...	...	...	0 4 0	0 4 0	Ditto ...	3	...	0 6 0	¼	1 8 0	
Ditto ditto ...	Dhenkli ...	10	7	...	...	...	1 0 0	1 0 0	0 2 0	2	...	0 4 0	⅛	2 0 0	
Kacha well	Ditto ...	10	7	1 8 0	1 8 0	0 3 0	1 0 0	1 0 0	0 2 0	2	...	0 4 0	⅛	2 0 0	
Pakka well for two buckets,	Lao and charas,	20	18	150 0 0	15 0 0	0 13 0	8 0 0	5 0 0	0 4 0	4	4	0 14 0	⅛	2 10 0	
Ditto ditto ...	Ditto ...	30	16	200 0 0	20 0 0	1 4 0	9 0 0	6 0 0	0 6 0	4	4	0 14 0	⅞	3 1 0	
Ditto ditto ...	Ditto ...	40	14	250 0 0	25 0 0	1 13 0	10 0 0	7 0 0	0 8 0	4	4	0 14 0	¼	3 8 0	
Ditto ditto ...	Ditto ...	29	55	150 0 0	15 0 0	0 5 0	8 0 0	5 0 0	0 2 0	20	...	2 8 0	1	2 8 0	See Azamgarh Settlement Report.
Ditto 3 feet in diameter	Chain-pump ...	20	14	100 0 0	10 0 0	0 11 0	80 0 0	8 0 0	0 9 0	4	...	0 8 0	¼	2 0 0	

TABLE II.

Showing cost of irrigation from various sources.

Source of irrigation.	Kind of water-lifts used.	Height of lifts.	Annual cost of well per acre.	Annual cost of water-lifts per acre.	Cost of labor in irrigating one acre once.	Cost of irrigation of one acre including proportionate cost of well and water-lift.				
						One watering.	Two waterings.	Three waterings.	Four waterings.	Eight waterings
		Feet.	Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.
Jhil, tank or stream	Bucket ...	3	...	Inappreciable,	0 12 0	0 12 0	1 8 0	2 4 0	3 0 0	6 0 0
Ditto ditto	Ditto ...	5	...	Ditto ...	1 8 0	1 8 0	3 0 0	4 8 0	6 0 0	12 0 0
Ditto ditto	Dhenkli ...	10	...	0 2 0	2 2 0	2 2 0	4 2 0	6 2 0	8 2 0	16 2 0
Kacha well	Ditto ...	10	0 3 0	0 2 0	2 0 0	2 5 0	4 5 0	6 5 0	8 5 0	16 5 0
Pakka well for two buckets	Lao and charas,	20	0 13 0	0 4 0	2 10 0	3 11 0	6 5 0	8 15 0	11 9 0	22 1 0
Ditto ditto	Ditto ...	30	1 4 0	0 6 0	3 1 0	4 11 0	7 12 0	10 13 0	13 14 0	26 2 0
Ditto ditto	Ditto ...	40	1 13 0	0 8 0	3 8 0	5 13 0	9 5 0	12 13 0	16 5 0	30 5 0
Ditto ditto	Ditto ...	20	0 5 0	0 2 0	2 8 0	2 15 0	5 7 0	7 15 0	10 7 0	20 7 0
Ditto 3 feet in diameter	Chain-pump ...	20	0 11 0	0 9 0	2 0 0	3 4 0	5 4 0	7 4 0	9 4 0	17 4 0

TABLE III.

Rates for flush canal-irrigation in N.-W. P.

Class.	Nature of crop.	Per acre. On Ganges and Eastern Jumna Canals.	Per acre. On Lower Ganges and Agra Canals.	Per.	Remarks.
		Rs. a. p.	Rs a. p.		
I.	Sugarcane and rice	5 0 0	6 10 8	Year ...	Requires 4 to 8 waterings.
II.	Tobacco, opium, vegetables, orchards and water-nuts	3 0 0	4 0 0	Crop ...	Number of waterings required is uncertain, as they are usually very light and frequent.
III.	On rabi crops, indigo, and cotton	2 4 0	3 0 0	Do. ...	Requies 2 to 4 waterings.
IV.	On kharif crops not specified above	1 8 0	2 0 0	Do. ...	Requires 1 to 3 waterings.

TABLE IV.

Comparison of cost of irrigation from canals and from wells, the height of lift being 20 feet.

Nature of crop.	Number of waterings.	Cost of irrigation from canals. Ganges Canal, and Eastern Jumna Canal.	Cost of irrigation from canals. Lower Ganges and Agra Canals	Cost of irrigation by chain-pump from a depth of 20 feet.	Remarks.
		Rs. a. p. Rs. a. p.	Rs. a. p. Rs. a. p.	Rs. a. p. Rs. a. p.	
Sugarcane	4 to 8	From 5 8 0 to 6 0 0	From 7 2 8 to 7 10 8	From 9 4 0 to 7 4 0	
Rabi crops, indigo, and cotton	2 to 4	From 2 8 0 to 2 12 0	From 3 4 0 to 3 8 0	From 5 4 0 to 9 4 0	

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APPENDIX C.

Proceedings of Committee Meeting, held on the 9th March 1881, *at the Canning College.*

SUBJECT DISCUSSED.—Whether any steps can or should be taken for the improvement of cattle ?

1. Paper read by Rana Shankar Baksh Bahadur, Vice President British India Association for Oudh.

2. Paper read by Kunwar Harnam Singh Bahadur, Ahluwalia, Manager of the Kapurthala Estates in Oudh.

3. Address by Sir Digbijai Singh Bahadur, K. C. S. I., Maharaja of Balrampur, President of the British India Association for Oudh, and President of the Talukdars' Agricultural Committee for Oudh.

4. Paper read by Mr. F. N. Wright, C. S., Director Agriculture and Commerce, N.-W. P. and Oudh, on "Fodder for Cattle," with additional memorandum by Major Noble, and with additional letter by Mr. G. P. Gartlan.

5. Paper read by Major C. S. Noble, Secretary to the Agricultural Meeting on "Fodder Farms for Cavalry and Artillery," together with

A.—Report of a special Committee assembled by order of Lieutenant General Cureton, C. B., commanding the Oudh Division, to consider this proposal of Fodder Farms.

B.—Memorandum by Lieutenant General Cureton on the report of that Special Committee.

C.—Memorandum by Major Boyce Combe, Assistant Quarter Master General.

6. Correspondence supplied by Mr. F. N. Wright, C. S., Director of Agriculture and Commerce on oil mills, and supply of oil cake for cattle.

7. Memorandum of Mr. F. N. Wright, C. S., Director of Agriculture and Commerce on cattle breeding, with extracts from annual report of the Awa Court of Wards Estate.

CATTLE IN OUDH.

THE Government of this country has before it no question of greater importance, in a revenue point of view, than that which deals with the preservation and improvement of the indigenous cattle of India.

With a diminished supply of sturdy active bullocks, the less productive will become the area of land under cultivation. The style of farming must obviously deteriorate, when the motive power for ploughs and such like agricultural implements grows weaker.

The main difficulty in introducing an improved plough, such as is used in Europe, arises from the inability of the weak country cattle to work it. Until the size and condition of the wretched bullock of this part of India has been improved, it is but grim irony to recommend the assami to try deep ploughing, which requires more motive power than he can command.

Such an improvement as is here contemplated might be gratually assured by care and judgment in selecting better cows and bulls for breeding purposes, and by providing a sufficiency of wholesome and nourishing fodder throughout the country.

It is not too much to say that from the day of their birth to that of their death, starvation is the normal state of the cattle over the greater part of Oudh. The blood of these stunted weakly animals has become so impoverished by want of proper food, that they fall victims by thousands to diseases which, were they in better condition, they would escape. Reduced by starvation to a low state of vitality, they have no stamina on which to oppose disease that either kills them outright, or, worse still, leaves them shadows and wrecks of their former selves. Had these victims of mismanagement been well fed and in good condition, they would, in all probability, not have been attacked by disease at all, or, if attacked, would have made a rapid and complete recovery. It is a useless waste of money to employ salutris and medicines in combating against cattle epidemics generated by starvation, unless at the same time some effort is made to destroy the generating cause. Such agents, so long as the root of the epidemic is allowed to remain, can only temporarily scotch the evil that they cannot kill.

The cattle of Oudh are remarkable for their emaciated condition, and diminutive size, while the mortality amongst them from disease is yearly on the increase. Partly owing to this mortality, and partly in consequence of a brisk demand for plough bullocks for a rapidly enlarged area of cultivation, a common "charsa" of leather for irrigation costs four times, and a pair of plough bullocks, twice as much as they did ten years ago. It is not difficult to comprehend what this rise in prices means to the cultivator. During the period of partial drought which visited Oudh this agricultural season, culivators were frequent, and urgent in their applications to Government for money

loans to enable them to purchase the necessary apparatus for the irrigation of their crops.

Our cattle would not be in this unsatisfactory condition if they were able to get enough to eat. Ample grazing grounds, and cheap and plentiful fodder, would in a few years work a wonderful improvement in the size, weight and strength of our cattle. Only three districts in Oudh, *viz.*, Kheri, Baraich and Gonda, owing to their being on the border of the Oudh forests, have any grazing grounds worthy of the name. The Kheri district has the reputation, which it formerly deserved from its extensive grazing grounds, of possessing three breeds of various excellence, known as the Parihar, the Dhaurara, and the Khairigarh. The first distinguished for its activity, courage and endurance, and, from its moderate size, for its serviceableness for the plough and light draught. The second for its strength, and is a larger and heavier beast. The third for its general usefulness.

The distinctions still exist, but are gradually dying out. It is difficult now to find half a dozen good Parihar cattle in the Parihar country, between the Katna and Goomti. The Dhaurara breed is still more difficult to find in pargana Dhaurara between the Chauka and Kauriala, and the Khairigarh stock is said to have lost all its distinctive marks.

In the north-west part of the Baraich district the indigenous breed of cattle is remarkably fine, but the Cows give a very small quantity of milk.

Here perhaps it might be possible for the Department of Agriculture and Commerce to discover and provide at reasonable prices some moderately sized bulls of an approved breed noted for having good milch kine. The Zemindars and Ahirs might be induced to purchase these bulls and so obtain a cross breed giving better milkers. The Forest officials perhaps might be asked to keep a stock of such imported bulls on sale, lending them to herdsmen in the dry months until purchasers appear.

Gonda, it is believed, is not so successful a cattle breeding district as the two just mentioned.

In the remainder nine districts, within the last few years, every bigha of waste land, capable of yielding a grain crop, has been broken up by the plough. The many jungles, in which, twenty years ago, large herds of cattle found food and shelter, have been supplanted by fields and waving corn. The only pastureless grounds on which the village cattle of to-day listlessly crawl and starve, are productive only of kunker gravel, or of poisonous shrubs, the leaves of which are too bitter to tempt even the all-devouring goat. It might, perhaps, be also argued that the wholesale destruction of jungles, has had some thing to do with the increasing frequency of drought that afflicts the land. It certainly has made the people more than ever dependent on cowdung for fuel.

The cattle of this part of India, except for a brief three months in the rainy season, and for a fortnight on the stubbles after harvest, have no grazing at all. In ordinary years they are kept alive from October to July, by

chopped straw, and "bhoosa", supplemented by grass and weeds pulled from the growing crops during January and February. When a season of drought causes a failure in the supply of "bhoosa", then leaves of trees, or thatching grass torn from the house roof is the only fodder available. A large proportion of the cattle in the Rae Bareli district were kept alive on a diet of house thatch during the severe drought of 1877, many villages being almost wholly unroofed for this purpose. Reduced in ordinary years to low condition by insufficient feeding, the cattle, early in July, suddenly find a rain crop of dank unwholesome grass which they devour to repletion.

This surfeit of watery food, void of real nourishment, acts injuriously on constitutions reduced by months of previous starvation, causing diarrhœa and a host of other complaints that often end in death. A season of drought is very fatal to cattle, absolutely dependent as they are for the greater part of the year on the "bhoosa" and weeds that the crops furnish. The practice of making and stacking hay does not obtain in these provinces, and in March of each year the cultivator sells all his "bhoosa", except the smallest quantum calculated to keep his cattle alive until next rainfall. August finds his store of "bhoosa" exhausted, and should there then ensue a season of drought, his cattle have nothing to eat but leaves and house thatch.

By a system of starvation, and ill regulated feeding, each generation of cattle becomes less robust, and more liable to disease. If this rapid deterioration is not quickly stemmed, there will, in a few years, be no animals bred in this part of the country fit for farm work.

It is easy to suggest remedial measures which read very well on paper, but it is a matter of the greatest difficulty to make really practicable proposals. The wholesale reform necessary to improve the condition and breed of country cattle must be gradual, and suited to localities. Many officers hold the opinion that Government interference is useless and to be deprecated. These would advise a policy of "masterly inactivity" until the country cattle have so diminished in numbers that they will become really valuable property, and the better cared for.

Others there are who cling to the happier belief that Government by advice, by encouragement, and by example, can do a great deal to avert such an agricultural calamity, as the destruction of its plough cattle would be, and to quicken agricultural improvements. There seems no good reason why progress should not be allowed and encouraged, or be limited to roads and rails. Every attempt Government may make to improve the cattle of Oudh must fail until the people learn to feed their cattle better. In most parts of Oudh were the population is so dense, the area covered with baghs so extensive, and every square yard of culturable land already under the plough, any scheme for reserved untilled grazing grounds would be impracticable. The only way in which a sufficiency of fodder will be obtainable, is to cultivate fodder and root crops with the same care that is bestowed on grain crops.

It must be proved to cultivators that it is almost, if not quite, as profitable to bestow the same care in the cultivation of fodder crops, as in that

of grain. It will take a very long time it is feared to get the people to engage in this new sort of cultivation, but none the less should the effort be made without delay.

The Agricultural Department might establish, on its Court of Wards Estates, farms to show how root crops and hay, as well as pasture, could be alternated with grain on the same land to the best advantage. Superintendents of Jails might be asked to undertake similar experiments.

The cultivation of mangold wurzel is unknow to assamis, though it has been tried in this part of the country and found to yield a most productive supply of leaf and root fodder for at least four months in the year.

The people too are utterly ignorant of the method for growing, making and stacking good hay. It is believed that if good meadow grasses were sown on cultivated soil, a very profitable out-turn of good hay could be obtained.

In this particular, the country simply requires educating. The people are already accustomed to preserve crops of self sown grass, but the value of this as provender is destroyed by their allowing it to get over ripe and over sun-dried before it is cut for use. The crop would be twice as nutritious and valuable were it cut when not over-ripe, and properly stacked before the sun has dried all the juices out of it.. *Most meadow land would yield two crops of hay in a single rainy season,* if it were ploughed, and manured, and sown with good grass seeds.

Talukdars and Zemindars could do much to assist the cause advocated, were they to encourage the cultivation of fodder crops by allowing their tenants to use good land for this purpose at a lighter rent than they would pay if it were under grain crops.

They could do a great deal too by investing money, the interest of which shall be devoted to an annual distribution of prizes for locally bred cattle, brought to such large melas as those of Adjudhia, Debi Patan, Syad Salar, Khairabad and Dalmau.

There should be at least 8 or 10 prizes for bulls at each fair, and as many for cows and bullocks and buffaloes. It will be better to give prizes for single bullocks, as well as for pairs of bullocks, and a few prizes might also be given for rams, sheep, and ponies. Such cattle shows and prizes would go a long way towards ingrafting a passion for breeding and possessing well grown handsome cattle, and would teach the people to exercise some care in selection of the bulls and cows they use for breeding purposes. The prizes too would tempt persons outside of Oudh to bring to the fairs good bulls and cows, which the people of this province would be able and ready to purchase. The bullocks selected for prizes should be of the sturdy, moderate sized sort, such as culivators must purchase, not tall swift animals only fit for bahlis.

Prizes should also be given for cows which give the greatest quantity of milk, and for *bona fide* cultivators plough bullocks that are in the best working condition. The prizes should not be entirely cash, as natives value such mark of approval when conveyed in the shape of a medal or of gold thread

pagris. Thus a prize for best bull might consist of a silver medal, plus Rs. 80 or 50 in cash, that for a ram a silver thread "pagri" plus Rs. 10 in cash.

Bulls selected for prizes should be strong, broad chested, short legged, and furnished with good long horns, and not less than four years old. The hornless or short horned bulls are often driven away from cows by little weak country bred bulls provided with long horns. The large Hissar bulls are of no use for the Oudh small sized cows.

It is almost needless to remark that all intelligent landowners should do their best to stop the reckless breaking up of grazing grounds, and fuel plantations. The whole question of improvement of cattle is fraught with great difficulty, and is mixed up with religious prejudices, and with the cognate question of fuel supply.

Government would not be thought perhaps to interfere too much were it to—

1. Select river and alluvial land specially suited for cattle breeding and grazing purposes, and where such lands are subject to short leases, to stipulate on renewal of the lease that the growth and cultivation of fodder only shall be permitted.

2. To teach the people that fodder cultivation is profitable, by establishing fodder farms at all cantonments for the wants of cavalry and artillery horses.

3. To discourage the further breaking up of existing grazing grounds, and jungle tracts in Nazul and Court of Wards Estates, and to encourage the cultivation of fodder on those estates by granting favorable leases for fodder farms. Also to purchase and maintain good selected bulls of indigenous or imported stock for serving gratis the cows of the tenantry, for this purpose allowing the bulls to roam about those villages where there are most cows.

The larger Court of Wards Estate could do a great deal by way of example, were they to purchase and import and sell to their tenantry at cheap prices good Mysore or other bulls of moderate size and weight. They should see that these bulls are located within reach of all their villages, and by eliminating, castrating, or transporting, all weakly indigenous bulls, or young bull caves not intended for breeding purposes, they would ensure that cows were served only by approved sires.

4. To grant an annual sum of money to supplement the prizes provided by Talukdars for locally bred or imported cattle exhibited at the large local melas.

In some villages of the Rae Bareli district the once existing jungles and pasture grounds have all been cultivated, so that there now remain no meadows for the cattle to graze at will, and to thrive upon.—Cattle that graze on pasture lands derive great benefit, for they feed in this way more heartily than when tied up, and are far more stout and strong than the stall fed beasts.

There will be considerable expense in trying to breed in this district such fine cattle as are produced in Kheri, or rather, I should say, it is almost impossible for us to do so.—All we can do is, to maintain sufficient animals of moderate size, and strong enough for agricultural purposes.

In order to improve the breed I think every Talukdar should have from one to two bulls.

In the districts were there is but little pasture, the Talukdar or landlord of the place ought to leave uncultivated that portion of land which is adjacent to a river and fit to produce grass, and just as much of other lands as will give a grazing area of 10 per cent. of his Taluka. If those grazing lands have been assessed to revenue, he should apply to Government for remission.

Whenever a calf is born of good stock, the fact should be registered, that the animal may not be lost sight of. In this way it is hoped the number and quality of locally bred cattle may be increased and improved, to the advantage of landlord and tenant.

The sole reason why one district has better cattle than another, is, that the pasture of one is better than in the other. Hence the above plans if adopted, will yield a great benefit both to the cultivators and landlords.

At the time of regular settlement the Government exempted 10 per cent. of total area for groves, and it would not be of less use to adopt the same rules for pastures, and this land be selected according to the Talukdar's or Zemindar's judgment, and left uncultivated for grazing purposes.

Any one taking the same into cultivation to be liable to have the pasture land assessed at once to revenue.

A pasture tract might be established in each tahsil under the direct management of Government and Talukdars, the latter being permitted to keep so many animals on the pasture as they may pay fees for.

Any good calves bred in such pasture lands should be distributed in their estates, by the Talukdars.

This will be of great use to those places, which have no good breed and have no jungle or grazing tracts.

CATTLE.

The paper read by Rana Shankar Bakhsh on the improvement of the breed of cattle, deals with a subject that is of vital importance to the agricultural interests of the country, and deserves quite as careful a consideration as the question of wells, canals, manure, implements of husbandry, &c. For us, the propagation and rearing of a superior breed of cattle has a twofold significance. In the first place, horses being, under existing circumstances, useless for purposes of agriculture, bullocks better than those diminutive, half-starved creatures, hitherto employed in tilling the soil, are absolutely necessary for a thorough and efficient ploughing; and secondly, in a country like India, where the peasantry are, generally speaking, poor, with nothing to fall back upon when the crops fail, stock-raising, and dairy-farming, carried on along with cultivation, would seem to be one of the best remedies; and I believe that, if the introduction of a better breed of cattle becomes practicable, it will be but a natural and easy transition from that to the popularizing of dairy farms.

Now the question is, how to improve the breed of cattle? No doubt by giving us a superior species of bulls, by holding fairs, and giving prizes for the best cattle exhibited, something has been done, and much may be done, towards promoting the object aimed at. But still, a very great drawback will always be felt; and my impression is—and I believe it is obvious to those who have thought on the subject—that the animals introduced, though themselves of a superior kind, are not expected to propagate a breed of cattle very much superior to that existing in the country, owing (1) to our cows being inferior, (2) to the impracticability of keeping the new breed always separate from the old, and (3) to the innutritious fodder these parts produce. Then as to fairs, it is much to be regretted that those for whose benefit and encouragement they are held, do not understand nor fully appreciate the intentions of Government in this respect; and the consequence is that year after year we see the same animals brought for exhibition, and very little done towards improving the breed. Yet most of such drawbacks might be remedied, if those interested in the agricultural welfare of the province would only judiciously use the means and opportunities at their command.

In the Punjab, where, generally speaking, the condition of the cattle is much better than those in Oudh, the state of things may be attributed partly to climate, but chiefly to fodder. In the kharif season we have *màsh*, *mùng*, maize stocks neatly chopped, *gohàrà*, and chopped sugarcane heads; and in the rabí season, the bhùsa of wheat, barley, gram, and lentils. Besides these, *mothe* and *charì* in the former, and *senjì* and *methe* in the latter season, are specially grown for fodder. In some cases plots of green crops are abandoned to them to feed on at will. In fact, all the year round, except July and Agust, when green grass is abundant, the cattle of the Punjab are more liberally fed than the poor creatures here, which are made to subsist on any thing they pick up in the almost bare fields, or, at best, on the chopped stocks of the *karwì* and coarse bhùsa.

The system of cattle-feeding in the Punjab is as follows:—

In April, on the bhùsa of barley.

May, on the bhùsa of lentils, wheat, and barley.

June, do. do. do.

July, on the green grass.

August, do.

September, on the charì and gohárá.

October, do. do.

November, on the charì and bhùsa of mothe, mùng and másh.

December, on the maize stocks and sugarcane heads, with mothe, mùng, &c., as in the preceding month.

January, on the bhùsa of wheat and mothe.

February, on the bhùsa of wheat, with senjì and methe.

March, do. do. do.

However imperfect the system of feeding cattle in the Punjab may appear to be, still it will hardly be disputed that it is better than that in Oude, particularly when it is taken into consideration that in the former province the custom is all but universal to grow certain crops for no other purpose than feeding cattle; and I think that very great stress should be laid on the subject of provender, even in preference to the question of a superior breed of cattle, as both the propagation and keeping up a superior breed and providing the province with stronger animals for a more efficient ploughing of the soil, almost entirely depend upon the question of fodder. Indeed, if these parts could afford to give more abundant and nutritious fodder, the necessity of introducing any other breed might be done away with; for these very animals would, in course of time, improve under better treatment, and answer all the agricultural requirements of our people here. The question therefore is, not so much what breed of cattle to give us, but rather what fodder to raise for the animals we have?—and how to get our peasantry to fall in with our views and readily adopt our suggestion?—This I leave to the discussion and decision of the committe.

In proposing certain remedies, we are apt to overlook a very necessary point for consideration, namely, whether the views advanced would suit the prejudices and the circumstances of the people, and whether what is feasible and advantageous in a civilized and prosperous country will exactly meet the wants of a people sunk in almost primitive ignorance, and struggling with poverty? Who will question the superiority and efficiency of scientific manuring, the utility of English ploughs, and all their splendid machinery and implements, of European methods of stock-raising and cattle-feeding? Who does not believe that our agricultural prosperity will be ultimately secured by the efforts Government is making in this direction? Officers, too, in their private capacity, as well-wishers of India, are disinterestedly engaged in devising and proposing plans for the achievement of the same desirable object. But of all that exists,

and all that is proposed, *how much* will really benefit us, under present circumstances? That is the question. We, indeed, expect much from all that is being done; but we shall certainly be disappointed if our wants and expectations are exceeded. Our cattle want better food and better care; but it will not do to point out to us what is done in England, or to propose something that is only a modification of what exists there. To say, "Let us adopt the best course, and usage will make it easy," would be vain, so far as our peasantry are concerned. Let us rather pitch upon a plan at once—the simplest, easiest, and least expensive. Be that plan imperfect—we want no better at present. In accordance with this view, therefore, I will throw out for consideration the following plan, presuming that if the good of the country is sincerely contemplated, zamindars, taluqdars, in fact all interested in the subject, must extend a helping hand, and, in doing so, cheerfully submit to some sacrifice in the beginning.

The plan is, to let cultivators have one *pakka bigah* for each plough free of rent, to be used for the production of fodder. Land under cultivation need not be given where a portion of culturable waste land is available and conveniently situated for the tenant. But it will be absolutely necessary to give a *bigah* free of rent out of the cultivated land where the culturable waste does not exist. Although I have not the statistics of any district with me, whereby I could fix the exact proportion of cultivated land that falls to each plough, but taking for granted that 50 *kachcha bigahs* are tilled with one plough, the annual rent would amount to Rs. 37–8–0, at the rate of 12 annas per *kachcha bigah*. The land-owner, by giving up one *pakka bigah* (= 3 *kachcha* bigahs), would therefore lose only Rs. 2–4–0 out of the Rs. 37–8–0—a sum that he could, if he liked, gradually raise on the 47 *bigahs* left, that is to say, at the rate of one *anna* per *bigah;* and the ryots, too, whose cultivation would improve under deep ploughing, with the help of strong bullocks, would not feel this enhancement of the rent. The land-owners should see, however, that in neither case what is set apart for the purpose mentioned is utilized in any other way. He should strictly enjoin *patwaris*, and others, to use their best influence in inducing cultivators to avail themselves of the privilege. No doubt rules for the guidance of *patwaris* would be necessary, but these can be framed, if my proposal is approved of by the Committee. Difficulties may arise at first, but it is hoped they will be only of such a nature as can be overcome by a steady and earnest perseverance, and the exercise of a little tact. The present state of affairs may be owing to a disinclination on the part of the ryot to give up his old ways, or to the fact that, pressed by poverty, he can ill-afford to spare a *bigah* of land merely for the raising of fodder; but, when the rent on it is remitted, and the benefits he would reap are clearly explained to him, it is not too much to suppose that, as a rational being, he would understand what is good for him, and gladly accept the offer that is made to him. As to what species of fodder to cultivate, I think it would be best to leave it to the option and good sense of the cultivator. If it be unadvisable to do so, let the raising of such food plants only be insisted on as are not foreign to Oudh. Other indigenous Indian fodder plants might also be mentioned, but these had better be introduced in this province when fodder cultivation becomes more popular. Lucerne, too, might be suggested along with the latter.

By the introduction of a superior breed of cattle, it is believed that, with other benefits to agriculture in general, a deep ploughing of the soil will be effected; and, anticipating this, improved ploughs and tools have been manufactured by the Agricultural Department, and distributed as models to native agriculturists. Deep ploughing, manuring, and irrigation, have an importance of their own in the art of agriculture, and I am fully sensible of the fact; still, I do not think that they should be recommended for every district in India. I have received reliable information that in rich soils deep ploughing produces only luxuriant plants, at the expense of grain, in the first year, and in the second a much poorer crop. Deep ploughing requires good manuring, and the latter good irrigation. If so, can India afford these everywhere?

Another proposal that I should like to make to taluqdars is the establishment of model farms, where the usefulness of the hints and suggestions thrown out by the Agricultural Department, as well as the implements of cultivation furnished by it for trial, might be practically tested. The information given in return, after experiment, would certainly be turned to good account. As a model farm, it should come under the inspection of most of the cultivators once or twice a year. They should be invited to come and see it, the working of the farm clearly explained to them, and the advantages, as well as the practicability of all that may have been accomplished there, impressed upon them. An impetus to arboriculture might also be given by these farms, by raising plants in nurseries there.

Government is not expected to establish model farms everywhere; indeed, such things fall more within the sphere of duties incumbent on taluqdars, and and it is they who should give the matter their most serious consideration. If they were to set about it zealously, I am sure good results would not ultimately fail to crown their efforts. But since it is a question of time, taluqdars would have to exercise patience, and should not be deterred by discouraging circumstances in the beginning. As to the expense that would be incurred, there could hardly be a doubt as to the possibility of a reimbursement in course of time.

HARNAM SINGH,

Ahhiwalia.

EXTRACT from Dr. Bonavia's Report for 1873-74.

ONOBRYCHIS SATIVA.—This is an annual which is largely grown in Italy and Sicily for fodder. It produces beautiful red flowers, and is known among florists as French honey-suckle. I accidentally procured some acclimatized seed of it last year. It grew to the height of 4 feet, and most luxuriantly, on a plot manured with river clay. It was in no way inferior to what I have seen in Europe.

FODDER.

MEMORANDUM.

Having within the last few days seen a very luxuriant and heavy crop of the red flowering "onobrychis sativa" in the Horticultural Gardens at Lucknow, and being struck with the vigour of it's growth, I made enquiries from the "malees," who assured me that Dr. Bonavia had cut it and fed the garden bullocks on it some years ago, using it as we use lucerne. In appearance it is somewhat like lucerne but with a larger, broader, leaf, and thicker, and softer stem. The gardeners assured me the bullocks seemed to relish, and thrive on the crop. The climate and soil of Lucknow appear to suit the plant, and it will be well worth while indenting on the Department of Agriculture and Commerce for a supply of seed, and trying it in all the 12 districts of Oudh. It should apparently be sown about the end of October, and it will probably be ready for continuous cutting from 15th January to end of April, or perhaps later. I append Dr. Bonavia's report on the plant extracted from his report on the Horticultural Gardens for the years 1873-1874.

LUCKNOW :
19th *March* 1881.

CHAS. S. NOBLE, MAJOR,
Secretary Talukdars' Agri. Meeting.

FODDER FARMS.

Hay and artificially grown fodder in Cantonments would be invaluable in supplying the wants of the Cavalry, Artillery, and slaughter cattle. A farm for such crops would be plentifully furnished with manure by conservancy sweepings, Cavalry and Artillery horse-litter, and Commissariat and slaughter-house refuse.

Good grazing cannot be had in India between the months of December and July, for the reason, that grass does not sprout nor grow during that period. For the requirements of those seven months ample stores of hay should be collected, and nutritious fodder crops grown by artificial irrigation. It is believed that excellent hay could be made in India, if really good grasses were sown on ploughed lands at the commencement of each rainy season. For the dry months, carrots are available in January and February, and lucerne in every month of the year. Guinea grass also is excellent feeding for horses, and will give a continuous supply of good grass fodder, the surplus being dried for hay and bedding. All that is required is that the same care be bestowed on the cultivation of fodder crops, as on grain crops.

It is well known in what straits the Cavalry at Lucknow were for fodder during the drought of 1877-78. The Regiments had to move their horses into camps many miles away from Cantonments in search of grass.

It is unfortunately notorious how much irritation is caused to zamindars for many miles round large Cantonments by Cavalry and Artillery grass-cutters trespassing after, and forcibly carrying off fodder that is barely enough for the wants of the village cattle.

The present utter neglect to grow and store sufficient fodder for the wants of the Army is not only a mistaken policy, but is unworthy of a great Military Power. If the Commanding Officer of every Cavalry Regiment and Artillery Battery, was required to keep up a fodder farm, and to have a stock of hay in reserve sufficient for a year's supply, and if the state of his fodder farm and store was as carefully scrutinized as the condition of his men and horses, the necessity for trespassing on the grass reserves of villages would disappear, the horses would get much better food than they now have, and there would be no such fodder difficulties experienced in a year of drought as assailed us in 1877-78.

Why should not a "General Order" be issued that the establishment of Regimental grass-cutters will on an early date be reduced to one-half of its present strength, and the money saved by this reduction be placed at the disposal of Commanding Officers for the purpose of keeping up stores of hay and fodder farms ?

An interest in these regimental fodder farms might be stimulated by allotting a certain area to each troop, by an annual distribution of prizes for the best and most productive troop farms, for best crop of lucerne or carrots, or for best stack of hay.

The principle to work upon should be, that officers concerned should be held responsible that the stable refuse of each horse is so applied, that the animal shall be supplied with good fodder sufficient to keep it in first rate condition.

With abundant European supervising agency available, with an ample supply of good manure in the shape of stable litter, and of barrack sweepings, regimental fodder farms if properly worked, must prove a great financial success, whilst their strategic usefulness must be apparent to every one. If, however, the maintenance and supervision of fodder farms is made over to the already overworked Commissariat Officer, they will as surely fail and prove expensive. It would be better that the Cantonment Magistrate or the Divisional Staff should manage the farms, than let the Commissariat Department be saddled with them. No management could, however, be so thorough and efficient as that by regimental officers, and the labor imposed on them in seeing that the native farm servants are doing their work, and that the crops look flourishing on the farms near their regimental stables, would be very small, not more than 15 or 20 minutes per diem. It will be enough for the Commissariat Department to look after a small fodder farm sufficient for the requirements of its own draught and slaughter cattle.

In Oudh "grass rakhs" would never be provided by Government, and why should they, when it is possible to secure as much fodder from one acre of well tilled, well manured, well irrigated land, as from 10 acres of "grass rakh ?"

Moreover in seasons of drought the grass "rakhs" in the Punjab have always necessarily failed, for in drought no grass will grow unless artificially irrigated. Fodder farms would give a certain supply of provender come drought, come wet.

Fodder Farms for Cavalry and Artillery.

Assuming there are 80 horses in a troop, it is calculated that a fodder farm of 32 bighas, portions of it being cropped in rotation with carrots, lucerne and meadow grass, would give a daily supply of 9¾ seers of the very best and most nourishing food to each horse in the troop throughout the year. This calculation is based on the supposition that the proportions of crops are as follows :—

			Bighas.
Lucerne	...	...	12
Carrots	...	...	10
Meadow grass		...	10

If the above proportion of crops be maintained, the out-turn at a low estimate would be as follows :—

		Mds.
Hay from 10 bighas	...	450
Lucerne daily cut 12 bighas	...	5,000
Carrots, from 10 bighas	...	1,200

Giving an annual total of 6,650 maunds, or a daily total of 728 seers, or 9¾ seers, of first class fodder per diem, for each one of a troop of 80 horses. This supply of farm-grown fodder would, with proper irrigation and care, be unaffected by drought, whilst its quality would be infinitely superior to the dry, coarse grass which grass-cutters bring in during the hot season.

Under the present system of regimental grass-cutters it is believed that the allowance in weight of coarse grass given in cavalry stables is not more than 10 seers per diem to each horse. The following is a liberal calculation of the cost that would be incurred in keeping up and starting a fodder farm of 32 bighas area, sufficient for a troop of 80 horses :—

	Rs.
Rent of land at Rs. 4. per bigha, per annum ...	128
Hire of four pairs of bullocks with drivers at Rs. 10 per mensem, for each pair, including man	480
Wages of 4 boys at Rs. 2-8 per boy, per mensem for "purh" work.	120
Wages of 3 farm labourers at Rs. 4 per man ...	144
Purchase of seed, repairs to, and renewal of farm gear, and miscellaneous	100
Total	972

The implements required for working the 32 bighas would be, one bullock-cart, 4 ploughs, 4 leather irrigation bags called "purh," and 4 "purh" ropes. The total cost of these would not exceed Rs. 100. A good irrigation well, large enough to allow four "purh" to work at one and the same time, would be required in the centre of each troop farm. Such a well could ordinarily be constructed for Rs. 700, and would, if well built, last for fifty years. An ample supply of good manure would be available from stable and barrack sweepings.

To start a fodder farm, then, for 80 horses, an outlay of not more than Rs. 800 is required, and the annual cost of keeping it up would not exceed in round numbers, Rs. 1,000. The present sanctioned establishment for 80 troop horses is believed to be 40 grass-cutters, each of whom brings in 20 seers of grass per diem, during the dry months, and 40 seers when grass is plentiful. The extra grass brought in during the rainy season is used as bedding for the horses. One grass-cutter therefore is allowed for every two horses, and, as before stated, the weight of grass he is bound to supply every day to each horse is 10 seers. In seasons of drought, and indeed in ordinary dry seasons, the grass brought in by the grass-cutters is often of very inferior quality, while the irritation and annoyance caused to zemindars for miles round large cantonments by the grass-cutters trespassing in search of fodder is but too well-known. The cost of these 40 grass-cutters, each one of whom has to keep a tattoo, is Rs. 8 per man a month, and the total cost per troop per annum is Rs. 3,840, always supposing the troop has a strength of 80 horses. If in future only 20 grass-cutters were maintained for each troop, *i.e.*, one grass-cutter for every 4 horses, there would be an annual saving of grass-cutters' wages amounting to Rs. 1,920 per troop. If this annual saving were applied, as is here proposed, for the maintenance of a troop fodder farm, the result would be that each horse would get a daily allowance in fodder as follows :—

9¾ seers (*vide* above) of first class farm-grown fodder, 5 seers of grass brought in by grass-cutters.

This would give a total of 14¾ seers of fodder per diem to each horse, as against their present allowance of only 10 seers.

After paying the expenses of working the farm, there would still remain a balance of Rs. 920 per troop of the savings made in wages of grass-cutters brought under reduction, or in a regiment of 7 troops a total saving of upwards of Rs. 6,000 per annum. If it were possible to employ to a certain extent troop horses in the working of the farms, the saving would be still greater. With a practically unlimited supply of European supervising agency, regimental fodder farms ought to prove an unqualified success. Their establishment as a measure of economy, as well as in the interests of expensive cavalry horses, is greatly to be desired.

The fact that regiments are repeatedly moved from one station to another, is by no means an insuperable obstacle to the proper management of fodder farms, as it would be easy to have the produce on the farm, or in the stack yard, valued, and to require the in-coming regiment to pay the value thereof to the departing corps. The Cantonment Staff would be able to take charge of the farm, and see that it is properly worked, should the garrison for a short time be deprived of a Cavalry regiment.

Near large cantonments it is possible that plough-bullock hire is not so cheap as it is in villages. The argument I wish to put forward is, that setting economy altogether on one side, it is desirable to have better fodder for our Cavalry horses than they now get. The only means of supplying better fodder is to grow fodder crops on good cultivated ground. The people of the country at present have not learned to cultivate fodder crops to the extent required: so the Government in the Military Department will have to grow their own fodder. Though I am convinced that with high farming and plenty of manure the out-turn of the 32-bigha farm, as estimated in my former letter, could with ease be secured, I will now give an estimate showing a larger area for a troop farm, and a diminished out-turn. Let us suppose the troop of 80 horses has a farm of 40 bighas, on which

	Bighas.
Hay is cultivated on	14
Lucerne	16
Carrots	10

With high farming a very low estimate of out-turn per annum would be on these 40 bighas as follows—:

	Mds.
Hay	560
Lucerne	5,600
Carrots	1,000
Total ...	7,160

This would give each of the 80 troop horses 9¾ seers per diem of rich fodder, in addition to the 5 seers of common grass from the supply brought

in by the 20 grass-cutters. This increase of area under fodder farm would raise the cost of working it; and the cost would stand as follows :—

	Rs.
Rent at Rs. 4 on 40 bighas	160
Hire of 5 pairs of bullocks at the very high rate of Rs. 15 per mensem, including man ...	900
Wages of 5 boys at Rs. 2-8	150
Wages of 3 men at Rs. 4	144
Seed and miscellaneous	100
Total ...	1,454

If this high rate of expenditure were adopted, there would still be a troop saving of Rs. 466 on the wages of the 20 discharged grass-cutters In most Cantonments, moreover, there is enough land for the farms, and the land would be available free of rent. Regiments, however, ought to be able to pay the light rent of Rs. 4 per bigha towards Cantonment funds, from the profits of the farms.

I have heard it argued that a reduction in the number of grass-cutters and their ponies would render a Regiment less ready for immediate service inasmuch as the ponies are required to carry stable gear, while the grass, cutters have to provide grass on the march As for the provision of grass at each halting place, the onus of doing this falls almost entirely on the civil authorities, who could be safely trusted to arrange for an adequate supply. The question of carrying power for Regimental necessaries is, however, one of paramount importance, and I now proceed to give figures to show that the reduction in the number of grass-cutters and ponies, and the substitution in their place of farm servants and of plough bullocks, will furnish increased transport power to regiments on the move. Up to this time I have touched only on the subject of forage, and I therefore estimated for the purchase of one bullock-cart only for each troop farm. To obtain an enhanced power of transport I must again slightly alter my figures, (1) in the amount of money required to start a troop farm; (2) in the amount of money expended each month in keeping up a troop farm. I now propose, for transport purposes, to purchase five carts in lieu of one for each troop farm, at a cost of Rs. 50 for each cart. A two-bullock cart can easily carry 25 maunds of luggage, and five carts would therefore transport 125 maunds. One pony with pack-saddle cannot safely be laden with more than three maunds. The 20 discharged ponies, therefore, would have been equal to carrying a total of 60 maunds, as against the 125 maunds by the five carts entertained in place of the ponies. In a campaign where food for man and beast is procured with difficulty, the feeding of five pairs of bullocks and five bullock-drivers would be far less expensive than that of 20 grass-cutters and their 20 ponies. I hold, then, that the above figures show that by reducing the number of grass-cutters and of grass cutters' ponies, and by substituting farm bullocks, servants, and carts, a regiment would be actually in greater readiness for active and immediate service. Moreover, a great deal might be done to increase the carrying power of grass-cutters'ponies. As I have before said, a pack-saddle pony should

not ordinarily be laden with more than three maunds, but the same pony, if harnessed to a well made *ekka*, would on an average good road easily draw five maunds. The 20 ponies I propose to leave with each troop would therefore transport 60 maunds on pack-saddles, and 100 maunds on *ekkas*. I suggest that Government should offer (i) a prize of Rs. 1,000 for the best design of a strong two-bullock cart, capable of carrying 25 maunds, easily taken to pieces and transported by railway; (ii) a prize of Rs. 1,000 for the best design of a pony-*ekka*, equal to carrying five maunds, easily taken to pieces and transported by railway; (iii) a prize of Rs. 1000 for the best design of *ekka*-pony harness convertable into a pack-saddle at will. With such prizes offered I doubt not that human ingenuity would speedily devise thoroughly efficient articles of the sort above described invaluable as means of transport. Let us compare the carrying power of a troop of 80 horses as it now is, with what I consider it might be.

	Ponies.		Maunds.
(1) Present strength of grass-cutters' ponies with a regiment of 7 troops with 80 horses in each troop, each pony to carry 3 maunds on a pack-saddle, ...	280	carrying	840
(2) Proposed strength of five two-bullock carts, each carrying 25 maunds, and of 20 ponies, each pony drawing five maunds on an *ekka*, for a regiment of seven troops, each troop having 80 horses ...	35	Carts. carrying	875
	140	Ponies. do.	420
		Total ...	1,295

The proposed reorganization, therefore, of the present transport service of a Cavalry regiment would, at almost precisely the same cost (as I will shortly show) as is now incurred, enable a regiment to carry 455 maunds more luggage than it now does. The writer of this would not recommend Government to buy or keep its own bullocks or ponies for farm and transport service. Owners of such animals would be very ready to take service at the rate of Rs. 15 per pair of bullocks including driver per mensem—and of Rs. 8 per pony including man, provided that men were duly enrolled and guaranteed a pension of half their salary after 25 years' service, and full pension after 35 years' service. With such a guarantee, and improved prospects, the men would be very willing to pay the prime cost of their carts and *ekkas* and harness, and the necessary expenditure on repairs to the same. It might be advantageous to raise the grass-cutters' wages, too, from Rs. 8 to Rs. 10, requiring them to provide a better class of pony. This increase of salary would raise the monthly expenditure on 20 grass-cutters per troop from Rs. 160 to Rs. 200. Under the altered figures and circumstances the prime outlay in starting a fodder farm of 40 bighas, and an improved transport service for a single troop of 80 horses in a cavalry regiment, would be Rs. 1,000. The annual cost of keeping both farm and transport service up, would not exceed Rs. 3,854 (*viz.*, farm, Rs. 1,454, plus 20 grass-cutters at Rs. 10, to Rs. 2,400) with a daily fodder supply of 14¼ seers to each horse, and a troop transport power of 185 maunds as against the present annual expenditure of Rs. 3,840, with a daily supply of only 10 seers of inferior fodder to each horse, and a present troop transport power of only 120 maunds. There is no greater curse to the struggling agriculturists of India than the constant forcible seizure of their carts and cattle for the use of troops on the march. That seizure but too often means absolute ruin to the cultivator and his family. This cruel evil would in an appreciable degree be mitigated

by the entertainment of a regimental transport service such as is here advocated. It has always appeared to me practicable that a Cavalry Regiment and a Battery of Artillery on the march might use one-third of its horses with pack-saddles to help in carrying the regimental impedimenta. It would be no great hardship to a cavalry soldier to do a march on foot, or to a cavalry horse to carry three or four maunds on a pack-saddle every third day. It is further possible that the transport service of a mounted regiment, not on the move, could be temporarily lent to an infantry corps on the march, the regimental fodder farm and grass-cutting work being for the interim carried on by locally hired labour. When once fodder farms are established near to the stables, it would, perhaps, be not too much to expect that each cavalry horse should get daily pack-saddle exercise by fetching his fodder to his stall.

In conclusion, should it be argued that a Cavalry regiment must often go where carts and ekkas could not follow, it must be remembered that one good pack-saddle bullock will carry almost as much as two ponies, and that therefore present regimental transport power would not be impaired by substituting bullocks for ponies.

The measures here advocated are only half measures and tentative. If the fodder farms after 2 or 3 years careful management are found to be a success a further reduction of grass-cutters, and enlargement of area under fodder cultivation would be desirable.

LUCKNOW: 28*th February*, 1881.

CHARLES S. NOBLE, MAJOR,
Secretary, Oudh Agricultural Meeting.

PROCEEDINGS of a station Committee re-assembled at Dilkoosha on the 3rd March by order of Lieut.-Genl. Commanding Division for the purpose of considering whether a better system can be adopted for providing grass for Government horses.

PRESIDENT:

Liut.-Col. Wood, 10th Hussars.

MEMBERS:

Lieut.-Col. Campbell, 2 Bengal. Cav. | Major Hume, R. H. A.

The Committee having assembled pursuant to order, proceed to read certain papers laid before them, on the subject of fodder farms, and having perused one marked A* and attached to proceedings, they have numbered the paras. and record their opinion as follows:

* Fodder Farms by Major C. S. Noble, B. S. C.

With regard to para. No. 1, the committee entirely concur with the statement made.

With para. No. 2, they also agree. The statement in No. 3, is also correct. With statement in No. 4 they partially agree, but consider that the irritation is not caused so much by the actual abstraction of the grass as from trespass and damage done to the crops when they are getting ripe.

Para. 5, opens an idea of a new scheme, which has evidently been well and carefully studied, but the committee consider that it is impossible for Commanding Officers of Cavalry Regiments and Batteries of Artillery to start and keep up a fodder farm with their present organization.

Para. 6, appears to be only reducing the nuisance complained of in para. 4, and the money saved by the reduction would not be sufficient to start a fodder farm.

Para. 7. The idea in this is erroneous, as, if fodder farms were ordered, it would simply be a matter of duty.

Para 8, needs no comment.

With para. 9 the committee agree so far, that if fodder farms were properly worked, they would prove a great financial success, but they consider that they should be Government, and not regimental fodder farms.

They certainly should not be worked by the Commissariat who have already plenty to do.

Nor do the committee consider that either the Cantonment Magistrate or the Divisional Staff should be called on to undertake this work, while regimental officers have neither time to spare nor (in most cases) the experience necessary in such matters as fodder farms.

As to these fodder farms being close to the regimental stables, the committee know of no station where sufficient ground near the regimental stables would be available, and if at a distance from the stables, the supervision of regimental officers would be still more impracticable. Even taking the low estimate of 42 bighas per troop as the ground required, one regiment alone would require 192 bighas of land.

The committee do not see why grass *rukhs* should not be provided by Government in Oude, although it is stated in *para.* 10 that this is not possible.

With regard to *para.* 11 the experience of the committee is, that the statement as to the grass *rukhs* in the Punjab is not borne out by facts.

With regard to the subsequent paras. on the subject of fodder farms, the committee are of opinion that the statements are based on the minimum of outlay and the maximum of produce.

The committee, however, agree that, setting economy altogether on one side, it is very desirable to have better fodder for Government horses than that which they now get.

With this end in view they think it would be well worth while for Government to try the experiment of a fodder farm near some large Cantonment, say Lucknow.

This might be thrown open to either contract or private enterprise, and supervised by some trustworthy European.

When the produce of the farm is fit for use, it will then be for Government to decide upon the reduction of a part or the whole of the grass-cutters, as a matter of economy; but the committee consider that this scheme should be proved to be perfectly practical before any reduction be made in the establishment of grass-cutters.

Pending this experiment, should the Government think fit to try it, the Committee recommend that land should either be purchased or rented in the vicinity of Lucknow as grass *rukhs*.

EDWARD S. WOOD, Lt.-Col., 10th Hussars, ... *President.*

C. W. CAMPBELL, Lt.-Col., 2 Bengal Caualry, ... } *Members.*
ED. A. HUME, Major, Royal Horse Artillery, ... }

Remarks by Lieut.-General Cureton, C. B., *Commanding Oude Division.*

I have read with much interest the paper on fodder farms by Major Noble, and the report of Colonel Wood's Committee regarding the future provision of grass for Government horses.

Major Noble condemns the Government (para. 5) for not storing sufficient fodder for the horses, and then proceeds in continuation to relieve Government of all responsibility regarding grass, by recommending the discharge of a large portion of the grass-cutters and their ponies that grass may be paid for from the money saved. This would strike at the efficiency of both Artillery and Cavalry, for service in the field, bullocks and carts being required to fill the places of ponies.

It must be remembered that when on the march a pony has to convey to the next encamping ground the traps belonging to the horse; remaining grass too is taken if there is scarcity; he then has to go many miles to bring in grass for that day and night.

These ponies march 3 to 3½ miles an hour, and this pace enables them to get through their work. How long does Major Noble think it would take a bullock with a load to march 10 to 15 miles, and then again, how long would it be before the horses' grass was brought into Camp? A bullock's pace being from 2 to 2½ miles an hour.

It is highly desirable that grass "*rukhs*" be provided by Government. This has answered well in the Punjab, and there is no reason it should not also in Oude. It is as much interest to the State to supply good grass to Government cattle as grain. Well tilled, highly irrigated and manured land prepared for grass is, to all purposes a rukh, but more expensive, (see para. 10). Fodder from such land is seldom wholesome: it grows rapidly but is rank, and not nourishing.

Finally, it is impossible for land in Cantonments to be granted for large grass farms. The utmost we can do is to have small farms near the horse lines for the growth of lucerne, guinea grass, &c., and this is successfully carried out in this and most other large stations.

I quite agree with the recommendations and remarks of Lt.-Col. Wood's Committee.

C. CURETON.

QUARTER-MASTER GENERAL'S OFFICE,

OUDH DIVISION,

Lucknow, 28th February 1881.

In view to the existing scarcity of grass in the immediate neighbourhood of Lucknow and the ever-increasing difficulty of obtaining sufficient for the requirements of the mounted corps in garrison, Lt.-Genl. Gureton has directed the assembly of a committee, to consider the question generally and to report on the best means of ensuring a regular supply of good forage at all seasons.

The attention of the committee has been invited to some letters which have lately appeared in the *Pioneer* under the signature of MILES, advocating the establishment of fodder farms under troop and battery supervision, and they have been requested to take these proposals into consideration, elaborate them, or make any other suggestions which may occur to them.

It is also understood that the question of "fodder for cattle and cultivation of grass lands" will be one of the subjects for discussion at the ensuing Agricultural Meeting when great stress will, it is believed, be laid on the injustice done to the petty farmers and landowners in allowing regimental and other grass-cutters to trespass on their lands and deprive them of a quantity of grass which would otherwise be available for their own cattle, and which is, moreover, a marketable commodity to the value of which these agricultural classes are getting more and more alive.

On the data obtained from this discussion, and with the report of the committe, it is hoped the military authorities may be in a position to make definite and tangible recommendations to Government in view to a satisfactory solution of what has long been recognized as a question urgently requiring consideration.

In the meantime MILES' proposals have been circulated and opinions invited from various officers, and the general, if not universal, idea is that these proposals are impracticable.

It is doubted whether sufficient lands exist either in cantonments or sufficiently near to enable them to be placed under Regimental supervision, such as that proposed, or, given the lands, whether sufficient water could be found to make the grass lands to a certain extent independent of the rainfall,—a very necessary precaution in view to the frequent failure of the rains within the last few years.

Given land and water, it would be difficult, if not impossible, to obtain the requisite regimental, *i. e.*, European supervision. The amount of work involved by such supervision may seem very slight, but the duties of Cavalry soldiers are already so numerous that in very few cases can men be got even to look after their Regimental or Troop gardens which are established for their personal benefit and amusement, and for the cultivation of which Government offer yearly liberal money prizes, and any proposal to detach more men from their legitimate duties to look after fodder farms would be strenuously opposed by Commanding Officers.

The first outlay for cost of taking up and preparing the land, sinking wells, purchase of seeds, well-gear, ploughs, etc., etc., would be very great and could only be recouped, if ever, by a very large reduction in the number of grass-cutters, and many officers object to this step as seriously affecting the mobility of a Cavalry regiment, as, in case of a sudden emergency necessitating troops taking the field either for active service or on account of an epidemic, the full number of grass-cutters would be required to enable a regiment to move freely, and independently of the civil authorities' ability to lay in supplies of grass at certain places by certain dates.

On the other hand, it is urged that the whole system of supplying grass through the medium of grass-cutters is out of date and unworthy of a civilized state of society; that Government should recognize the fact that grass on private lands is private property, to which they have no more right, without payment, than they would have under similar circumstances in England, and that contracts should be made for the supply of hay and grass, as for that of gram etc., and that in the exceptional circumstances of troops taking the field or moving by road, green crops or any available forage, such as bhoosa, should be purchased and paid for on the spot by the officer in command, as would actually have to be done if the troops were making forced marches or were in an enemy's country or in a hostile district, in either of which cases the grass-cutters would probably be of little use.

In the case of Native Cavalry who are liable to be sent in small detachments to distant and isolated outposts, where such contracts could not be made, they might safely be left to make some arrangements locally for a supply of forage.

I am myself of opinion that the requirements of the case would be met by an extension of the system actually obtaining in some of the larger stations, such as Umballa, Gwalior, Rawal Pindi, etc, under which Government have already taken up and demarcated large tracts of land and allotted them as grass rukhs to the various mounted corps, but to obtain the full value of these rukhs, they should be much nearer Cantonments than they usually are: all regimental manure and litter, etc. should be taken out and thrown on the land, arrangement should, if possible, be made for irrigation in seasons of drought, and a small staff of natives should be detailed from the corps to which the various rukhs are allotted, for their care and protection.

In most regimental lines there is ample space with water ready available, for the establishment of lucerne gardens of which the produce would make a welcome and beneficial addition to the grass ration for such of the horses as might require it. In many cases the gardens already exist, and there is no reason why they should not be universally maintained.

The small expenses are easily defrayed out of the Regimental Grass Fund, to which all fines are credited, pay of deficient grass-cutters, etc., etc.

BOYCE COMLE, *Lieut.-Col.*,

Dy. Ast. Qr.-Mr. General.

MR. F. N. WRIGHT'S PAPER ON OIL.

Connected with the subject of cattle fodder is the question of pressing the oil-seeds in this country instead of sending them to England, thereby increasing the stock of oil-cake in the country for the cattle, and, in fact, returning to the soil through the cattle that which has been taken from it by the growing plant. You have the translation of several letters before you in which the subject is dealt with from various points of view. Mr. Buck thinks Australia would be a favorable market for the oil: this is doubtful, but the information as yet obtained is not sufficient to justify a decision on this point; but in any case Australia will only take a small portion of India's produce, and though the demand will grow, it is not to Australia alone we should look. Now, the simplest method of carrying out the idea of keeping the oil-cake in the country, will be found in establishing a local demand for the oil. The Railway Companies take castor oil largely, but it is doubtful whether there is any very large demand for linseed or mustard oil. England imports oil seeds because she wants both cake and oil too—the former, if possible, more than the latter.

Now there is in Calcutta an oil-mill which pays well, but then there is a large local demand for daily consumption. In Cawnpore, too, the experiment has been tried of setting up an oil-mill, and I have, I think, satisfied myself that its want of success is only due to the unintelligent greediness of its proprietors (chiefly natives, I am sorry to say). The machinery is perfect—I have seen it myself—the demand for cake was so great that every piece made was sold at once at the door; the oil, too, obtained a sale, but a regular demand was not forthcoming—a large contract of a Railway, for instance, would be the best way of securing that. Mr. Bond speaks from his trials that the thing won't pay, but Mr. Crowe, who managed the affair till the owners fell out amongst themselves as to the profits, says that Mr. Bond hadn't time to devote to the business, which is especially one which requires personal and constant supervision. Mr. Cooper, on the other hand, as a merchant, does not favor the scheme, and merchants are keen enough to find out wherever so little profit is forthcoming. The matter is not, in my opinion, ripe for a final decision. I recommend it to your consideration. What papers I have are at your service. The machinery is standing at Cawnpore in perfect order and for sale, only do not appear too eager to get it, or the price will go up at once. The question is a highly important one ; but the question of profit and loss is for business men to work out for themselves. In such matters official opinion goes for nothing.

No. $\frac{T}{162A}$ of 1881.

FROM

THE DIR., DEPT. OF AGRI. AND COMMERCE,
NORTH-WESTERN PROVINCES AND OUDH,

TO

THE SECY., TALUKDARS' AGRI. EXHIBITION,
Lucknow.

Dated Gaziabad, the 6th of February, 1881.

SIR,

I beg to forward you a copy of a note received from Mr. Buck, on the subject of the establishment of oil presses in India. In 1880, Mr. Buck, commenced making enquiries, on this subject, and it would seem, hoped that oil presses might be established on the estates of the Maharajah of Kapurthala and Balrampur. Nothing however seems to have been done in this direction.

2. With this year's probably marvellous crop of mustard seen, Mr. Buck's note comes in opportunely, and I beg that you will circulate it to the taluqdars and others in Oudh, in order that the question may be discussed at the approaching conference.

3. Mr. Buck's first idea was to encourage export to England; but a letter from Mr. Caird (copy of which I enclose) seems to have turned his attention in the direction of the Australian market, and the present letter is the result of enquiries made by him there.

4. That the retention in this country of the cake from the seeds which are exported annually is a most desirable object as adding to the fodder supply, requires no proof. But Mr. Caird places the question of the Indian cake consumer very plainly before us: can he afford to pay $\frac{3}{4}$ per lb. for cake for his cattle, that being the price he must pay to make it more profitable to crush the seed in India than to export it to England? I find here where I am writing, that rape cake is selling at 26 lbs for the rupee, or less than $\frac{1}{2}d.$ per lb.: "till" cake at 28 seers per rupee or even cheaper: linseed is not grown. You can probably supplement these figures by others from the Oudh Districts, and especially from the trans-Gogra tracts where so much oil seed of various kinds is grown.

5. On the other hand, Mr. Buck gives us figures which show the position the oil exporter would have in the Australian market. Mr. Buck, I may remark, does not inform us from what country this market is at present supplied. In any case as the total trade aggregates only £20,000, India would have to oust(*i. e.*, undersell) some other exporting country, supposing she does not already supply the Australian market. Nor does Mr. Buck seem to hold out promises of the demand being extended, though in a growing country like Australia, this may to a certain extent be taken for granted.

6. Failing a foreign market, we have to consider whether local demand for the oil is not sufficient to encourage the establishment of an oil press in India, as it has been found with the tobacco industry at Pusa, originally established for export purposes, but finding sufficient local demand to take all the manufactured tobacco it can turn out. Mr. O'Conor, in reply to a letter from Mr. Buck, says, that oil mills are the best paying concerns in Calcutta: but they are kept up by natives who make the oil for local wants more than for export. The oil mills here find ready customers for all their cake. I know a native here who has set up his son in business with an oil and surki mill, and he is making handsone profits, about 20 per cent- I think.

7. There is plainly a large demand in the country for cake, and can it be increased? At present we know the "teli" supplies the local demand round every village: but it is not clear whether his supply of cake is limited by the demand for *oil*, or whether the people crush for cake, and sell the oil for the best price they can. I am inclined to think the former is the case, in which case as we know kerosine is gradually finding its way into outlying towns at least, the local demand for vegetable oils will not be likely to increase but rather diminish.

8. I have specifications in this office of oil mills, but they are not sufficiently clear to enable me to say positively what would really be required. I will endeavour to get some clearer information before the Conference, but it should be noticed that in Calcutta the mills crush seed *and grind surki*. It is one of the great obstacles to the use of any expensive machinery in this country, that it can very often be only used for one purpose. Thus the capital invested lies idle for the greater part of the year. The same is the case with steam engines for water-lifting, threshing, and so on. In a large city like Calcutta, there is of course always a demand (for instance for *surki*); there would not be on any outling estate. How then could the capital invested be utilized, where there is no seed to crush? To a certain extent the substitution of bullock power for steam power would meet this objection; but even then the outlay on the machinery for oil pressing alone will be great.

9. Mr. Buck is of opinion that Government ought to pioneer an enterprise of this sort, but I am often inclined to think that the large body of European traders already in the country (especially in Cawnpore) looking everywhere for an opening; had they seen it pay them better to export oil than seed, would probably have taken to the industry before this. This is of course no argument for one standing still, but it is an element in the general question to be considered.

10. It would of course be a great saving in carriage to press the seed in the locality where it is produced, instead of taking it to Cawnpore, or Patna, for export. Fyzabad recommended itself to Mr. Buck as a good place in which such an oil mill might be established, and I trust the Deputy Commissioner will kindly favor me with his opinion on the question as now laid before him, apart from the general discussion which it is proposed to hold at the Conference. Could his municipality engage in such a venture as the establishment of an oil press?

11. The only chance of a step in the direction indicated by Mr. Buck lies in the free publication of all the information available, and I trust therefore you may be able to give wide circulation to his note. In my opinion it will be time enough after the matter has received full discussion to lay it before Government.

12. I should mention that there were formerly steam oil mills in Cawnpore which failed ; and that the hand presses, I am informed, barely pay their way.

I have the honor to be
Sir,
Your most obedient servant,
F. N. WRIGHT,
Offg. Director.

To

THE DIRECTOR OF AGRICULTURE AND COMMERCE,
N.-W. P. AND OUDH.

Dated January, 5th, 1881.

SIR,

I request the favor of your submitting a copy of this note for the information of Government, with any further remarks which you may wish to make.

2. In the cold weather of 1879-80 I conferred with H. H. the Maharajah of Balrampur (by the wish of H. H. Sir George Couper) on the possibility of working oil mills in some part of his territory, with the main object of keeping the oil cake in the country as cattle food. I enquired through Mr Caird, who was good enough to allow me to do so, as to prospect in the English market, the result of the enquiries being *primâ facie* evidence, that the oil would not be taken by English buyers at a remunerative price, in consequence of the great value of oil cake to English seed buyers, who pass it into the hands of cattle food-sellers or consumers.

3. I then undertook to enquire in the Australian and American markets (where cattle food is not required in great quantity), whether there would be any demand at a remunerative price for oil without cake.

4. I have, through the kindness of Messrs. Henty & Co. from whose office I address this letter, obtained statistical information, which will afford a sufficient basis for preliminary calculation. The price obtainable in Melbourne for oil is about a shilling a gallon, or 50 per cent. higher than in England, and the demand is a steady one (like to continue) for about £20,000 worth annually. It will in my opinion be well worth taking the question of erecting mills into serious consideration, in the prospect of securing this trade, but before any steps are necessary it will be requisite—

(1)—To make close enquiries as to the cost of turning out pure linseed oil.

(2)—To ascertain at what cost either iron drums or kerosine tins can be obtained. With reference to the latter, I am told that the taint of kerosine is not likely to injure the oil which is almost wholly required for paint.

5. There is I believe a mill in Calcutta which turns out linseed oil for local consumption. Some information can be obtained thence as to cost of manufacture.

6. It is essential, if any attempt is made to open a trade, that the supply both in quantity and quality should be uniformly maintained. Irregularity will choke progress. Messrs. Henty & Co. are perfectly willing, and able to push the trade, if the oil can be landed of as good quality as, and cheaper than, the oil now coming to the market.

7. I append the queries and answers to which I have referred in para. 4, containing the information which I have obtained through Messrs. Henty & Co.

I am Sir,
Yours faithfully,
(Sd.) E. C. BUCK,
President, Melbourne Exhibition Committee for India.

1. What is the invoice price of linseed in England ?	1. Raw (London quoted) 2*s.* 1*d.* Boiled 2-3 per gallon. At these prices would cost 3-5 per gallon all round in bond at Melbourne.
2. Of what are the cases inwhich it is sent constructed? What are their size? Can any estimate be given of their cost?	2. Usually sent out in iron drums containing 5 gallons costing 2*s.* 6*d*, each, also in barrels, 40 galls., costing 7*s.* each.
3. Would cases in which castor oil is sent from India answer for linseed oil?	3. Think the cases and tins like castor oil would do, if like kerosine cases to prevent much leakage. The latter have better tops and lids.
4 What is cost of carriage for England?	4. Freight (sailing vessel) 2*d.* per gallon. 5 per cent.
5. What is price in Melbourne, exclusive of duty?	5. See query 1.
6. Average quantity yearly imported?	6. 1879 was 139,733 gals. £21,781.
7. Would rape oil find any market?	7. Very little used here at 3*s.* 10*d.*-2.
8. How could trade be pushed?	8. Messrs. Henty & Co. will receive and dispose of any consignment.

(Sd.) E. C. BUCK.

LONDON,
3 St. James Square, S. W.,
February 27th. 1880.

My dear Mr. Buck,

I was unable to answer your letter on linseed and cake of 27th January by return of post, not having received it until I returned from Scotland, where I had been called by the death of my brother. But I have made a point to answer you by this mail in time, I hope to reach you before you leave for England.

I got an introduction to Messrs. George Evans of Crosby House, Bishopsgate Street, and had a long conversation with the principal to-day. The proportion of cake to seed is much higher than you put it at, and therefore the advantage of keeping it in India so much the greater ; 5 maunds, or 410lbs, of fine Calcutta linseed yields 130lbs. of oil, and 280lbs. of cake. Very fine rape seed will give 140lbs. of oil, to 270lbs. of cake.

The buyers of oil, and of linseed are different people ; they do not deal with each other. The oil is sold in the market, and brought without any consideration as to where it is crushed, but simply on its merits. If all the Indian linseed was crushed in India, the English crushers might have to change their business, but the oil would be equally in demand, according to its quality, as you will see by the enclosed list of prices.

There is thus no question on the part of the trade that needs to be considered. The only question is whether your Indian Agriculturist can afford to give the price (less the cost of transport) which the British farmers find it their interest to pay for the cake. Instead of paying freight and charges on 1,000 tons of linseed, you would pay it only on 324 tons of oil, keeping for home consumption the 676 tons of oil cake. At £3 a ton saved in transport, you would have your oil cake that much cheaper than it brings in England. If we buy it, and can afford to do so at £10 a ton, would it pay you to buy it and use it in India at £7? That seems the only question, and your experience of India will enable you to answer it better than I can. If the freight is more than £3, the Indian farmer will have a proportionate advantage over his English competitor.

I should imagine that the linseed merchants in India have found, that they can make a better profit by sending us the seed, than the oil. If not, then you should try to keep the cake in India by crushing it there.

I observe, from the Indian report, that the yearly export of oil seeds is somewhere about 300,000 tons; out of this you might keep 200,000 tons of cake at home, which would no doubt help, but would go but a short way, amongst your many million head of cattle. Still it would be something, but all turns on the question whether you can afford to pay the price; perhaps one test of that may be the ordinary price of millet, as compared with cake at £7 a ton. The cake would cost 3 farthings a pound. I suppose you can buy millet generally for less.

Believe me,
Very truly yours,
(Sd.) WILLIAM CAIRD.

Cawnpore, 3rd February, 1881.

To

F. N. WRIGHT, Esq.,
Offg. Dir. Dept. of Agri. and Commerce,
North Western Provinces and Oudh.

Sir,

In answer to your favor of 31st ultimo I have given the oil question great consideration, and took the mills of Gooroo Pershad to see if anything could be done in the matter, but the results were by no means satisfactory. I worked the mills myself (taking my food in the mill house) to see that all was fair and *straight*, and the mill well worked.

It is one of Samuelson's with four hydraulic presses of his usual and well known pattern, and cost £3,300 in England, I think. It does not pay to crush oil here, and export, for the following reasons :—

1. The cake is worth more in England than here.

2. The oil is carried home cheaper in the seed than in casks. If a bag bursts the seed is still there, if a cask is damaged the whole is lost. There was a great difficulty even on our railways.

3. There is no advantage to be gained now by the use of superior machinery. Even now in Holland, the old system of the sledge competes with the best hydraulic mills.

4. There is this secret about all oils, they will not leave the seed at once, but require to be left some time under pressure to allow the oil to leave the pulp.

The Cawnpore mill answered best for linseed and mustard, then came tilly, after that poppy. But for castor-seed, the oil being thick, it was not a success, as the castor required to be so much longer under pressure, consequently could not do so much work with the mill per hour.

The native system is cheap and very effective, although rather dirty. The only real system for clearing oils is letting it stand ; this means capital. More oil is taken from new seed than old, but I think this is part water and looses in standing in the tanks.

I send you a few of my trials for your information. They were made in March and April 1874.

	Mds.	sr.	ch.	Mds.	sr.	ch.
Purchased in the bazar, linseed...				76	37	0
Lost in clearing dirt, &c.				3	29	0
	Mds.	sr.	ch.	73	8	0
This produced oil	21	23	0			
Lost in refining	0	13	0			
	21	10	0			
Linseed	48	13	0			
	69	23	0 =	69	23	0

Lost in crusher	3	25	0
Total loss in crusher	7	27	0

LINSEED.

	Rs.	A.	P.
100 maunds @ 3-10 per maund	362	8	0
Crushing charges 1-0 per maund	100	0	0
	462	8	0

This includes 0-8-0 for the use of the mill.

Cake produced 66 mds. 2-0-0 = ...	132	0	0		
Oil ,, 28 ,, 11-13-0 = ...	330	8	0		
				462	8	0

Loss 6
100

TIL SEED.

42 mds. 31 seers 4 ch. @ 12 s. 5 ch. per rupee = ...	134	13	0
1 ,, 11 ,, 4 ,, loss in clearing.			

41	20	0	clean seed.

	Mds.	sr.
Oil produced	13	20
Cake	26	30
Loss in crushing	1	10
	41	20

Total loss 2 mds. 21 seers 4 ch.

Produced cake 26 mds. 30 seers = 2-0-0 = ...	53	8	0
	81	5	0
Crushing charges	41	8	0
	122	13	0

13 maunds 20 seers oil = 122-13-0 = Rs. 9-1-6 per maund. This was a very superior class of sweet oil, but did not find a sale in the bazar or with large consumers.

YELLOW MUSTARD SEED.

					Rs.	A.	P.
51 mds. 22 seers 8 ch. @ 2-8 = ...					128	14	0.
Cake produced = ...	32 mds.	23 seers	8 ch.	@ 1-8			
Oil ,, ...	18	20	0				
Loss	0	19	0				
	51	22	8				
Actual expenses for fuel				14 0 0			
Rent of machine 0 4-0				4 10 0			
Labor				3 8 0 =	31	2	0
					160	0	0
32 mds. 23 seers cake @ 1-8					= 48	12	0
18 ,, 20 ,, oil for Rs. 111-4-0					= 111	4	0

Is equal to nearly 6-0-0 per md.

The oil varies in quantity from 28 to 36½ per cent of the seed.

You will see there is nothing charged for supervision. At Manauri station, East Indian Railway, the steam presses have been stopped, and the old screws by manual labor started again, for the very reason that steam acts too quick and does not allow the oil time to escape from the seed pulp, this causes great destruction with the bags used for pressing.

The oil was of very superior quality, but did not find a sale at a remunerative price. The linseed has a very dull sale and low price, except for printers, who use it in the preparation of ink for printing, it commanded a good price. Only a small consumption for this. The cake realised a good price as it was sent down to the Bengal famine.

If I can assist you at any time I shall feel a great pleasure in so doing, either with oil or any other project.

I remain,
Sir,
Yours very obediently.
(Sd.) T. T. BOND.

Cawnpore 9th February, 1881.

To

F. N. WRIGHT, Esq., c. s.
Offg Dir., Dept. of Agri. and Commerce,
North Western Provinces and Oudh,
Meerut.

Dear Sir,

I received your letter of the 5th instant, by last evening's post, after it had been travelling about for three days, as you will see by the post stamps on the enclosed envelope which I send, so that you should not think that I delayed answering. I now give you as concisely as possible the information you ask for about the oil mills I put up at Cawnpore, but on your arrival at Cawnpore, I could call on you and give you a more detailed account, which would be too long to put on paper—1st. The mills did not fail but were stopped owing to the three partners of the concern not agreeing on all points, and the whole concern was made over to one man who could not work them. After this Mr. Halsey was getting me the contract for one year's supply of 509 tons of castor oil for the G. I. P. Railway, Bombay, and I offered to take the mills and work them on my own account, and pay eight annas per maund for every maund of oil that I sent out of the mills to the owner. At this rate if 1,200 maunds per month was sold it would give him a rental of Rs. 600 per month, or Rs. 7,200 for the twelve months, and I calculated that I would have made as much profit myself. The owner at first consented, but afterwards would not agree because he thought I would get more than him, and wanted me to share the profit. This I would not do as I had enough of him already, and I was determined to only work them myself or not at all. 2nd. Our first outlay was about Rs. 40,000, but these mills could now be purchased for a good deal less, or else could be rented for less than half the price that I then offered, but they require a man that understands machinery to be present all the time it was at work, or else there would be no end of break-downs. It is capable of turning out 50 maunds of oil daily if kept supplied with seed; the proportion of seed to oil is three to one, *i. e.*, three maunds of seeds make one maund of oil if well pressed. 3rd. The machinery is driven by a twenty horse power engine and Cornish boiler which works very well; this drives a pair of edge stone rollers about 6″ diameter for crushing the seed into pulp; from this the pulp is put into steaming ovens, and got up to boiling point nearly; then from this it is filled into bags, and then put into the hydraulic presses, of which there are four, two pressing, and two emptying and refilling; thus keeping up a constant stream of oil. These presses almost press every particle of oil out of the seed, so that the oil cake is almost dry. 4th. I did state to Mr. Buck that it ought to pay, and I could have made it pay if I could have got the mills when I wanted them, and I have no doubt it would pay now if properly looked after. These mills were taken up by two or three parties, but they were not men that understood what they were about, they thought that they had simply to hire machinery, and that it ought to work, and give them return without any more trouble. In this they

were mistaken. Besides this they were not men that were prepared to keep up a supply of seed, 150 maunds of seed every day to keep the mills at full work, and without this it would be a dead loss to any one working such large mills, as, once the steam was up for the day, the more work done the less it would cost on the whole, and at the above quantity of seed it would require from 3,500 to 4,000 maunds of seed monthly to keep the mills in full swing and make them pay. This would entail an outlay of about Rs. 8,000 at least monthly, besides fuel and establishment, which would cost about another Rs. 500, and the novices that tried to work these mills never thought of all this, and had very soon to give them up. I will now conclude, but if I can give any more information I will do so gladly, and if you will kindly let me know when you come to Cawnpore, I will call on you.

I remain, &c.,
(Sd.) J. P. R. CROWE.

CAWNPORE, 18*th February* 1881.

MY DEAR WRIGHT,

I have been thinking over the oil-crushing matter, but can arrive at no very definite conclusion. One thing distinctly against the thing in this country is the cake difficulty it seems, for I find that Home prices for oil-cake by last advices are as follows, *viz* :—

	£	s.	d.		£	s.	s.	d.			Rs.	as.	p.
Linseed per ton	9	15	0	to	10	0		0	or say per	maund	4	7	0
Rape ,,	5	0	0		...			...	...	...	2	3	0
Cotton ,,	5	15	0		...			...	...	...	2	9	0

and it is clear that if the industry was carried on out here, manufacturers would have to export every ounce of the cake, as they could never hope to get any thing like such prices in this country. Granted that this could be done and that locally made cake would realize the same price in the home market as British crushed, there would then be the oil to dispose of and the bulk of this would have to go home too, the internal economy of the oil trade in this country being such as to prevent a ready sale of the article in *bulk*, which by the way would be necessary to the success of a crushing business. So far as I know there is not really a single big market in the whole country on which you could calculate, and this being so, the local crusher would either have to retail his produce at his factory's door, or export it in bulk. Putting the power of these aside as being impracticable, the industry would have to look solely to the European market as outlets for both oil and cake, and here, I think, we should be beaten hollow by European crushers ; simply because the profit margin in exporting oil seeds is so slender, and competition and speculative business so keen that these goods are frequently cheaper on the other side than at the local ports.

Briefly I may say that there does not appear to be enough money in the thing to induce men to go in for it, and from the little I know I certainly would not care to put money in it.

Mills have been tried in the Berars and the Deccan and all have failed, and I think I have hit on the right thing in saying that the want of local market is dead against the thing succeeding.

If you can use any arguments in favor of the enterpise I shall be very glad to reply to them, and shall also be happy to give you any information I can gather.

Your's sincerely,

(Sd.) W. E. COOPER.

P. S.—I have been looking over a lot of catalogues (machinery) but can find no mention made of oil-crushing machinery, so am afraid I can't help you regarding cost of putting up a factory.

I am going home in April, and if you would like to go into the question further, I will send you out specification.

I note what you say about the Australian demand, but if we could not compete in the Home market (I only assume we can't) we certainly should not be able to get on good terms with the Australian trade, as any saving in freight in favor of Indian goods, would be more than counter-balanced by the disadvantages above referred to. However, as I said before, if you have anything to show in favor of a local industry, I shall be happy to go into the thing further.

(Sd.) W. E. COOPER.

MR. F. N. WRIGHT'S CONCLUDING PAPER ON CATTLE.

You have heard the general opinion expressed with respect to the necessity of taking some steps to improve the breed of agricultural cattle. I say agricultural, for the demands and the price paid for carriage bullocks, is sufficient in itself to secure the supply of sufficiently large cattle in sufficiently large quantities. It is as well, however, to remember that we cannot get a good article without paying a good price for it. We have to remember also that there already exist certain good breeds of agricultural cattle, which only require to be known to obtain a demand larger than the supply. The difficulty is to get hold of them in sufficient quantities to supply the existing demand for good bulls—bulls which will give cattle fit for agricultural purposes. This Department has given its attention to the subject for some years past, but as yet has been unable to do more than supply a few bulls of the best quality. My assistant, Mr. Harrison, has been searching all along the tracts which fringe the Ken and Chambul rivers, noted for their breed of strong hardy cattle, and has only succeeded in getting eight, with a promise of twelve more. This number is, of course, quite inadequate for our purpose. It appears to this Department that an effective way of securing a regular and sufficient supply of bulls, fitted for agricultural purposes, is to establish cattle farms in convenient and suitable localities. Such native gentlemen as possess forest tracts have at hand one of the principal desiderata—abundance of forage. It would be a simple thing for them to do as my friend Ajodhya Porshad has—collect 200 cows, stable them well, feed them well, and breed from bulls supplied by this Department, or obtain elsewhere a regular supply of good bulls. There is a Government Cattle Farm at Hissar, but it is very difficult to get cattle from there, as the Punjab Government has the first lien on the outturns after Commissariat necessities are satisfied, so that we have been unable even to get two bulls this year from Hissar. I only mention this to show you that a Cattle Farm for the North-West Provinces and Oudh is an absolute necessity. Negotiations are on foot to establish such a farm in the Dun; but what is wanted for private enterprise is capital. Such a farm must succeed: the demand for good cattle is so great. But at present Government is not prepared to establish one on its own account. The next question is, when you have got your bulls what will you do with them? Will you let them out to graze with your herds, or will you stable them and allow cows to be brought to them? Mr. Crooke, the manager of the Awa estate, has established a Cattle Farm in a small way. He has collected five bulls of different kinds—one English (but I don't recommend English for agricultural works, only for milk), one from Mysore, one from Hissar, one Kenwaria, and one country, and has already a considerable number of good cows from the Muttra District (where a tract on the Jumna is famous for its good breed of cattle), and intends breeding a good class of bulls which he will distribute over the villages in his estate. He allows the villagers to bring their cows to these bulls, and select the one they wish to use. The young bulls, it is hoped, will be purchased by rich people who wish to release a bull on the

death of a relation, and so gradually a good class of cattle will be reared round about his estate. This system might be adopted in all large estates. The Manager should take a personal interest in getting the best sizes, the best cows, give them the best acommodation, and the best food. A strong useful class of animals will be thus reared, and the influence of this action will necessarily spread. Meanwhile, as far as possible, the covering any cows by *working* bulls must be absolutely discouraged; but it is impossible to prevent the people using inferior bulls till we give them better ones. Another and probably more quickly effective way of encouraging the improvement of cattle would be by prizes given at cattle fairs. If strict rules were made, restricting the prizes to those classes of cattle only which are required for agricultural purposes (such as have already been adopted at the famous fair of Batesar, and the results of which have already been beneficial), breeders will soon take steps to produce the cattle required. The subject is too long a one to be dealt with exhaustively at the end of a Conference, but if any one is interested in the subject I will with pleasure place at his disposal what papers there may be in this Department. It is for the Officers most fully acquainted with the resources and requirements of their Districts to suggest the details of any scheme for the establishment of local fairs, the prizes that should be given, and the source from which they should be met. But as in the case of horse-breeding, prizes given at local fairs have already had a great effect in improving the class of horses brought for sale, there can be no doubt that similar action, taken in respect to cattle, would produce most important results. I may further add that this Department is only too anxious to receive suggestions. A comparatively young Department cannot be expected to know everything and must always go on learning the new reasons, therefore all should help it in its endeavours to improve the agriculture of the country, by suggestions and real practical assistance.

During the past year we have, in the Agricultural Department, been making extended enquiries with the view of ascertaining in what way it may be possible for Government to improve the home-bred cattle of the province. Foreign-bred bullocks, which are largely supplied to the province, cannot be influenced by our exertions, but it may be possible to exercise great influence on home breeds

We still want more precise facts as to existing conditions (which should be collected on all Court of Wards' Estates, and notably at Awa), but the following sketch is believed to be not far off the truth:

The population of a village own—

(1) A large number of *bullocks*.

(2) A few bulls, used for agricultural operations.

(3) A few cows (of which, however, the number may not be inconsiderable in a village possessing much waste land).

In addition, there are in the village, or its neighbourhood, one, two, or more "Brahmani bulls," which are invariably let loose when young by the relations of well-to-do Hindus, chiefly Brahmans or Thakurs. Sometimes, when the deceased is a person of much consideration, trouble is taken to secure a really good animal, but, as a rule, but little choice is exercised.

When a cow is in a condition to be put to a bull she is generally turned out to a Brahmani, but it often happens in a village, where no Brahmani is available, or where the cultivators are careless, that the cow is covered by one of the ordinary working bulls.

On the other hand, if the cow is a really good one, and the owner desirous of obtaining a good calf, she is taken sometimes ten or twelve miles to a Brahmani of reputation, of which there are generally one or two in the pargana. That this is not at all an uncommon practice, I have been somewhat surprised to find.

When a cow calf is born she is always kept by the owner (if a Hindu), since a Hindu must not sell a cow; when a bull calf is born it is more often than not made over, at a year old or thereabouts, to the Banjaras or gipsy cattle dealers, who frequent the Duáb districts, by whom it is castrated and resold hereafter, when old enough to work, to cultivators, who (if Hindus), are not allowed by their religion to castrate their own bulls. Such are, as far as I have as yet ascertained them, existing conditions, and I have always insisted that our only chance of improving home-bred cattle is to adapt our means to existing conditions.

It is easy to see (if the conditions I have sketched are equally true over an extended area) what are the points for attack in connection with *improvement of breed.*

They are these—

In the first place, uncastrated bulls should not be allowed to be kept by cultivators (who, indeed, prefer bullocks) for agricultural purposes.

In the second place, no Brahmani of inferior class should be let loose.

In an estate like Awa, I should presume that sufficient influence could be exercised upon the cultivators to prevent their keeping uncastrated working cattle. The idea suggested itself that bull calves might be *bought* up by the landlord from the cultivators in whose possession they are born, but this practice would lead to all bull calves being brought to the landlord to buy, instead of their being disposed of to Banjaras, and the landlord would find it an expensive undertaking, which certainly would not be adopted by any other landlords than Government.

If, therefore, it were considered necessary to extend operations outside a Court of Wards' estate, it would become necessary to legislate, and forbid a working bull to be kept at all. I am inclined to believe that this is what may eventually have to be done; but, meanwhile, I advise that Mr. Benson should make the fullest inquiry into the subject and consult with intelligent natives on his estate as to their views, and the best method of preventing home breeding from inferior bulls kept by cultivators, in which way there is no doubt that the worst class of all are bred. All the native cultivators with whom I have discussed the subject acknowledge this fact.

The next question is, how to prevent inferior Brahmanis being let loose? Now, if anything is to be done in the direction of improving Brahmanis, it is very clear that good bulls *must* be made available in their place. It is at this point at which it is the duty of the landlord to step in. *He ought* to breed on his estate a herd of cattle from which really good bull calves of the required class can be selected. In this matter, as in so many others, the personal influence of the Manager must, on a Court of Wards' estate, be the first means used of preventing natives from letting loose any other bulls than those of the selected breeds; but here again, Government must legislate to prevent any other bulls being used, if operations are to be extended outside the Court of Wards' area. Bull calves throughout the country should be branded, and only branded bulls should be allowed to be established as a Brahmani.

Meanwhile, *e. i.*, before any such extended measures are introduced, we should insist on doing everything possible on our Court of Wards' estates to ensure the gradual substitution of good for bad Brahmanis; and it should be proclaimed throughout the villages that no Brahmanis will be allowed unless approved, or provided, by the Manager. In order to do this, it is plain that measures must be taken to provide bulls of the right class. I do not advise—indeed I protest against—the Manager himself deciding what is the right or most useful class. The cultivating population should undoubtedly be consulted on this matter, and if need be, a *panchâyat* constituted to pass bulls which they shall decide to meet all requirements.

The Agricultural Department will, on the other hand, exert itself to procure the bulls that are wanted to start the breed; while the Manager of the estate will undertake to raise a herd, both by inducing cultivators to bring their cows to be covered by these bulls and by breeding from them on the home farm with selected cows. Mr. Fuller selected, last year, under the advice of the Superintendent at Hissar, two bulls, one of which was specially adapted for a moderate-sized breed of plough cattle, the other for a small milk-giving breed. These it is proposed to make over to the estate at cost price. A third bull, of the famous Ken river breed, which are small, lusty, and strong, will also be procured. These three bulls, if approved by the cultivating population, will be retained on the estate. If not approved, will be returned to the Department.

F. N. WRIGHT,

IMPROVEMENT OF AGRICULTURAL IMPLEMENTS.

THE urgent want of the country in this direction is some ploughs which will cultivate deep, and at the same time, be light enough for an ordinary pair of cattle to draw, and some kind of pump which will raise water from wells at a cheaper cost than the method at present in use. The Department of Agriculture and Commerce has, to a certain extent, been able to meet these wants.

The value of deep ploughing is known to every cultivator. For valuable crops they use the phaura, or plough the same field over and over again, until the soil is pulverized to the required depth. But, as a rule, the ploughing generally practised all over the country is very shallow and requires improvement. The manure put on the land gradually falls under the surface soil, which being now exhausted by continued cropping, the under soil is required to be stirred up. There may be some land which has a bad soil underneath, which does injury if brought to the surface. But the cultivators know such lands, and deep-ploughing need not be used in them. But the area of such land is small, and deep cultivation may with advantage be used generally.

In former times, the European ploughs were as ineffective in deep ploughing as the Indian ploughs of the present day. But experience has taught the European nation that deep ploughs although heavy, produce larger crops, which more than compensate for the heavier draught, and the light plough has entirely disappeared from Europe and America.

The chief difference between the Indian and European method of tilling the soil lies not so much in depth to which the soil is cultivated, but in the fact that the European plough turns the soil right over, while the Indian plough merely stirs it. Most European ploughs are meant to be drawn by horses, and are too heavy for bullocks, unless two or three pairs are yoked. But a plough on an American model has been adopted by this Department which is very light, cheap, and simple, and which, with an ordinary pair of bullocks, will plough to a depth of 5 inches and turn the soil completely over to that depth. Many district officers and native gentlemen have used the plough, and give very favourable accounts of it.

It is possible that in the first year the crop may not be improved, since the earth which is brought up from below needs exposure to the air before it becomes matured, but in the second or third year, a large increase can be expected. On the Cawnpore farm a field, which had been ploughed with this plough for two years, gave an out-turn of 11½ maunds of wheat grain, and 20½ of bhusa to the acre, though it had only been twice ploughed, once in the rains, and again before sowing, and had not been manured for 3 years, The next field to it belonged to a *Cachi* cultivator, and had been ploughed by him with his own plough 11 times, and had been manured in the year preceding, but it only gave 12 maunds of wheat grain, and 24 maunds of

bhusa, so that turning over the soil in the European fashion gave an increase in produce to the value of at least Rs. 11-8-0 per acre ; both fields had been twice irrigated. In trying this plough portions of several fields should be ploughed, and their produce compared with that of the other portions.

The value of deep ploughing in India has over and over been proved by actual experiments all over the country in North-Western Provinces, Oudh, Punjab, and Madras. The following extracts are made from the report of Mr. Robertson of Madras, who is one of the most experienced scientific agriculturists in India.

" Some most mischievous opinions have recently been spread through India regarding the effect of deep cultivation in hot climates. I feel it my duty therefore to state most unreservedly that the result of my six years experience in actual cultivation in one of the hottest parts of Southern India, has convinced me, beyond all doubt, that the advantage the Madras farmer will secure by deeply tilling his soil can scarcely be overrated.

" Shallow cultivation is the curse of Indian agriculture, and the man who can induce the ryot to add an extra inch or two to the depth his tillage operations extend, will be as much entitled to the gratitude of his country, as the man who makes two blades of grass to grow where only one grew before.

" Now in referring to deep cultivation or deep tillage, I do not necessarily mean deep ploughing ; it is here, I believe, where the mistaken opinions before noticed have originated. By deep tillage or deep cultivation, I mean that the soil must be deeply stirred or loosened by the cultivator, the subsoil plough, &c. As a general rule, all soils will be benefited that are thus treated, but the case is different with deep ploughing when the soil is unfitted, as there are many soils that would be temporarily injured by being suddenly deep ploughed ; such soils, for instance, as those resting on a tenacious soapy subsoil, which in the process of deep ploughing would be brought to the surface, and would render the surface soils unproductive, until physical and chemical agencies had again restored it to a condition fit for the growth of crops, and it would, be equally as unwise to bring up to the surface, by working the plough more deeply, portions of a subsoil which is poorer than the surface soil, or that is calculated to injure the surface soil in its physical character."

But the value of deep ploughing was most conspicuous at the Allahabad farm in the drought of 1877-78, when the following differences were observed between joar crop on the deep and shallow ploughed field measured on the 1st September 1877 ;—

	Height of Plants.	
	Deep ploughed.	Shallow ploughed.
Manured land	2½ feet	1¾ feet.
Unmanured land ..	2¼ ,, ...	1½ ,,

In the deep ploughed fields the crops looked green and good, while in the shallow ploughed field they were yellow and dry. Mr. Phillips, Superintendent, Allahabad farm, stated :—"During the hot, dry, burning, weather we had last year (1877-78) there was such a great difference in the appearance of crops in each plot that I asked the Commissioner Mr. Plowden, and the Collector Mr. Quinton, to the farm to inspect them. On the English ploughed, and specially on the early ploughed ground, the plants looked quite fresh, and green, and did not seem to suffer from the want of rain, while all around on the native field the crops were yellow and burnt up. I quote from a letter received from Mr. Plowden after his visit of inspection to the farm :—"This is an interesting return, and I am gratified the experiment in the farm is succeeding so well, while the want of rain was pressing so heavily on all the autumn crops, how wonderfully well these experimental patches of autumn crops were looking. They were looking much the same as in an ordinary season, while the neighbouring crops had either not come up, or were stunted and dwarfed." The out-turn of joar in the fields ploughed under the two systems was as follows :—

	Fodder.	*Grain.*
	Mds.	Mds.
Deep plough ...	76	21½
Shallow plough.	78½	16
Percentage of increase in deep ploughing..	11	34

Mr. Robertson, of the Madras farm, also noticed the great superiority of the crops in a deep-ploughed field, to those on a shallow ploughed field, in a season of drought. He states :—"A dry season brings out in a decisive way the results of deep culture; during the long drought experienced last year, the maize plants growing on a piece of land on the experimental farm, that had been subsoil drained in the previous year, were more than twice as large, and proportionately luxuriant, that grew out the newly filled drains, as the plants that grew on the land between the lines of drains. The former during the greatest heat were always remarkably luxuriant; they drew their supplies of moisture far down below the parched surface of soil, while the plants on the intervening spaces were puny and sickly, their roots not being able to penetrate more than a few inches below the parched upper soil. Similar results I have always obtained wherever I have had the soil deeply cultivated. I have gradually year after year deepened the cultivation on the Sydapet farms, until the soil is fully 50 per cent. deeper than similar soil under ordinarily native farming, and I would gladly go deeper still. Indeed, I feel sure that we can never secure good average results from our farming until we do cultivate deeper. In the hottest season, the crops on the deeply tilled soil are generally fresh and luxuriant in appearance, while those growing on shallow soils are parched and withered." Much difference of opinion however still exists as to the efficacy of deep ploughing in Upper India.

The question as to whether deep ploughing is or is not fitted for the cultivation of the soil of Upper India is often discussed with but little

consideration of the very broad issue therein raised, or knowledge of the facts that bear on either side of it. As far as experiments go, we have proof both for and against the use of the plough (as opposed to the grubber) but it would be rash to decide off-hand on the as yet imperfect information we have, that in no case was it advisable to "turn over the soil." Where the fertile soil is already several inches deep, nothing but good can result from exposing to fresh aeration a stratum below that which has been for centuries scratched by the native plough; a new source of plant food is rendered available by the process; the soil is stirred to a fair depth, rendering it more retentive of moisture and allowing the roots of the growing plant to separate far and wide in search of food. Where, on the other hand, there is a substratum of an unfertile (or comparatively less fertile) soil, the result of deep ploughing may not only be not immediately beneficial, but positively injurious. Again surface feeders like the millets, and to a certain extent other cereals, do not require a deeply stirred soil, whilst plant with deep tap root cannot but be benefited by deep ploughing, such as has been effectually noticed in the case of cotton in the Rawalpur estate, where the staple was greatly improved by deep-ploughing, and such as is invariably practiced in those countries, where indigo is most highly cultivated.

It is necessary also to separate the consideration of the mechanical difficulties in the use of the swing-plough, from that of the general question of the beneficial or contrary effect of deep ploughing. A decision on the latter point depends on a scientific knowledge of the nature of the soils to be treated, and of the crop to be grown, whilst the mere mechanical difficulties, such as using a chain or rope (instead of a beam) the guiding the cattle, &c., are such as a little patience will overcome, or a little further experiment entirely cause to disappear. In any case it is in Court of Wards estates, and in estates of enterprising and intelligent proprietors alone, that the experiment of introducing a plough in place of the native grubbers can he really tried : no one is so fitted to feel the pulse of the native cultivator on this point as the managers and proprietors of these estates, and it is to them that this Department looks to furnish sufficient data to justify or condemn the improved agricultural implements, the use of which *a priori* reasoning may suggest.

PUMP.

Great attention has been paid by the Department of Agriculture and Commerce towards finding out some effective means for raising water from wells at a cheaper rate than can he done with the existing apparatus. A pump is made at the Cawnpore Farm which enables three men to lift from a depth of 15 to 20 feet more water than a pair of bullocks and 2 men can lift. The price of this pump is Rs. 35. As yet no method has been found to raise water in a cheaper way from greater depth, and this is considered as one of the greatest wants of the country, for it seems difficult to believe that water cannot be obtained from a depth of 40 or 50 feet at a less price than the water brought from a distance of 300 or 400 miles. Government have made this subject the special duty of an Engineer, and various experiments are being made to attain this object.

WINNOWERS.

Another great want in Indian Agriculture is that of an efficient method for separating grain from chaff, cleaning it from all admixture of dirt and other kind of seeds, and selecting the large grains for sowing purposes.

A very effective winnower is now made at the Cawnpore farm, the price of which is Rs. 30.

SUGAR MILLS.

The sugar mill made by Messrs Thomson and Mylne has found great favour in the eastern districts, and has entirely superceded the kolus. Large numbers of these mills were distributed in the North Western Provinces and Oudh.

The Bibea sugar mill of Messrs. Thomson and Mylne is beyond the stage of experiment and doubt, in which the kaisar or other improved ploughs still remain. Whenever it is placed at the disposal of the cultivator, its use is eagerly applied for, and a large order for more mills by Mr. Crooke, since received, shows that the superior quality of the juice expressed by, and econony of labour in the use of, the Bibea mill, have already popularised it to a considerable extent. The defect noticed by Mr. Crooke of the axles breaking has been brought by me to the notice of Messrs. Thomson and Mylne. They are fully alive to the necessity of putting before the cultivattors an implement, as perfect as possible, so that the whole of a profitable crop may not be imperilled from the mill breaking. Their agents are now found all over the country, and they have arranged for a depot at Roorkee(amongst other places) where broken cylinders can be sent for repairs or to be replaced.

SIEVE.

Mr. Harrison used at Rawatpur a simple and moderately cheap hand sieve for cleaning the wheat seed before sowing. This was invented by Mr. Wilson, a merchant of Cawnpur. A smaller and cheaper one is available at the workshops of this Department.

MAHARAJA SAHIB—

With your permisson I wish to say a a few words. Since I have no particular connection with Oudh and have only attended the meeting to watch its proceedings at the request of Mr. Wright, the Director of Agriculture and Commerce, my remarks on this occasion might appear a little uncalled for, but all the same I trust that considering the sisterly character of this association and the Bijnor agricultural institute which is founded by Raja Jaggat Sinha (now present here), and of which I have the honor to be the Secretary, you will excuse me if you find my speech in any way out of place. I believe this is the last day of the meeting, and such a distinguished assembly is not likely to meet again for some time to come, I therefore avail myself of this opportunity to impress upon the Talukdars of Oudh the extreme necessity of improving the indigenous agriculture of their province.

To attain this object practical steps should be taken :—

(1.) To communicate to landholders and cultivators information about those improved agricultural implements or processes that have, after various trials, been found to meet the wants of Indian cultivators. A gentleman has just said in reply to Pandit Ajudhia Prasad's interesting speech that new implements such as the Kaisar plough and the Behea sugar mills cannot benefit the cultivating community, in as much as their intricacy and cost are a bar to their general adoption. That gentleman will, I hope, pardon me when I say that he is not at all acquainted with these implements. The Kaisar ploughs and the Behea cane mills are in every respect suited to the agricultural conditions of these provinces, and there is nothing in them that presents unusual difficulties in regard to repairs. A common *Mistri* at Bijnor is, I find, quite able to make the Kaisar ploughs. And when an insignificant place like Bijnor can turn out these ploughs, it is difficult to see why the carpenters of larger towns in Oudh should not be able to manufacture them. The same man at Bijnor is also competent enough to make the Behea sugar mills, but as the latter are patented he cannot do so without the special permission of Messrs. Mylne and Thomson, the inventors of the mills. The latter have lately established a depôt at Dhampur in the Bijnor district, and more than 150 mills are already in use throughout the district. I have no experience of the Oudh kolhus, but so far as Bijnor is concerned, the cultivators consider the Behea mills for superior to their rude native contrivances. Messrs. Mylne and Thomson started their business by issuing the mills at first on hire, perhaps 8 annas a day, until the demand for them increased to such an extent that their agent had to summarily stop their letting out on hire and substitute the system of sale. These mills can, with small annual repairs, not costing more than Rs. 10 or 12, last for 7 years, and the cultivators are quite willing to undergo this expense when they see that the ordinary kolhus when broken, some times cost as much as Rs. 70 to set them up again. You will thus observe that the Department of Agriculture and Commerce is very particular in recommending such implements only as can be easily within the reach of all classes

of the rural population, and are, as such, likely to be appreciated by the general public.

(2.) To exhibit new agricultural implements or processes, and for this purpose there should be established experimental farms on large estates.

(3.) To supply good seed to cultivators, the Talukdar should establish a central grain depôt with numerous branches throughout the province, in order to obtain good seeds of all the crops grown in Oudh, from other parts of India that might be well known for them: provided the local seed is not of the best quality. The cultivators at present generally store away a portion of their rabi and kharif harvests for future sowings, but they should in future be induced to sell their respective quota of seed grain, and with the money so realized to purchase excellent seed at the central or branch depôts.

(4.) To improve the local breed of cattle. The chief auxiliaries to the improvement of stock are the supply of strong bulls for breeding purposes, the supply of good fodder, and the adoption of measures for the prevention of cattle-disease. The Talukdars' association should therefore establish (1) cattle breeding farms, (2) fodder farms wherein the indigenous fodder plants should be improved and new ones introduced, and (3) cattle disease medicine depôt where medicines might be procured for the several cattle diseases.

(5.) To protect the country from drought. I am hardly in a position to decide whether the construction of canals or that of wells is most advantageous to Oudh. That's a problem which you can solve best yourself. However I trust you will take immediate steps to facilitate the means of irrigation in this province.

It is no use saying that it is the duty of Government alone to develop the agricultural resources of India. There is an English proverb that "God helps those who help themselves." When you cannot expect help even from Heaven unless you set yourself in right earnest to attain the object in view, how is it possible that Government should do every thing for you and you be allowed to sit with folded arms? We ourselves must take the lead in this direction, and if we should come across any obstacle, too great to be surmounted by us alone, the Government would assuredly assist us. We are often charged with want of perseverence: in other words, it is said that our schemes vanish away like camphor as soon as they are launched and find but a mominal existence, but I am confident the Talukdars association will conclusively disprove the charge and leave no further room for such allegations. Allow me now to conclude with these words:—May success attend the Talukdars endeavors to advance agriculture, may the various projects that now only exist on paper find an appearance on the land of Oudh, and may the province ever continue to maintain the coveted title of "the Garden of India," which it owes chiefly to its fertile soil.

Speech delivered by Pandit Ajudhia Prasad, Illaquahdar Indalpur, zila Shahjahanpur, in the Lucknow Agricultural Meeting held on the 10th March 1881, relating to deep ploughing, and agricultural implements.

The discourse relating to agricultural implements which I have just heard, is no doubt very important. Out of all the implements mentioned therein my experience extends only to two, the English plough Kaisar, and the Bahea sugar mill. I would not go to detail at length the advantages of deep ploughing, as it is a fact with which every one from the highest agriculturist to the lowest cultivator is familiar. There is a saying among the cultivators which proves that deep ploughing is necessary to get a good crop. They say "nau nasi ek kasi" which means nine ploughings are equal to one digging. When it is generally acknowledged that deep ploughing is beneficial in its effects, it remains to be determined as to which is the most effectual and cheapest method of gaining this object. I should certainly say ploughing with the Kaisar, or any other similar light English plough. The Kaisar, or other English ploughs, plough deep and root out "dub" and other kinds of grass, which are generally very deeply rooted in the virgin soil in the vicinity of jungles. The Kaisar will undoubtly be used with great advantage in the north of the Balrampur and Tulsipur estates, as there the soil is mostly virgin and of a jungly nature. I mention this part of the estate of His Highness the Maharaja of Balrampur because I am personally acquaintsd with it. It is, in fact, quite similar to the lands in my estates where I have tried the experiments with the Kaisar, which have resulted in complete success. The Kaisar is specially useful and adapted for the sugarcane cultivation, and I would recommend its use as follows :—

In the rainy season, when the field is sufficiently moist and soft, plough the field once over with the Kaisar. It will turn up large clods of earth and the grass which is uppermost will thus be turned over and will come in contact with the grass adjacent, and these two layers of grass will be underneath the mud. No air can penetrate into the mud, and in consequence all the grass rots and becomes manure. Having once thus ploughed the soil for sugarcane, it ought to be left untouched for a week, and then the ploughing should be repeated. So only ploughing twice with the Kaisar is sufficient to prepare, and improve the field for the sugarcane.

In order to compare the results of sugarcane field ploughed with the Kaisar and the native ploughs, I last year prepared half of a sugarcane field with the Kaisar, and the other half with the country plough. The field was 21 bighas kham, or a little more than three acres. The soil of the whole field throughout was manured and watered equally. The crop on the Kaisar ploughed part bore to that on the other the proportion 3 : 2, that is, the produce resulting from the first was one-third more than that of the latter. The cane grown on the land ploughed with the Kaisar was nearly double in length of the cane grown on the other part of the field, it was besides more full of juice and softer to press. This illustration, in my opinion, is sufficient to prove the advantages of the English plough and deep ploughing.

I now come to the Bahea sugar mill. This year I bought two mills of this description through the Director of Agriculture and Commerce, and I can say I have used these with great success. I had altogether sixty kham bighas of sugarcane in two farms of mine. I must say that had I used even four country sugar mills, I would not have been able to press all my sugarcane in double the time in which I have been able to do so by the agency of these mills. One country mill presses at the most four matas of juice when working night and day (a mata containing about 3 maunds 20 seers of juice). But pressing four matas daily is not the common working rate for all the mills because few cultivators can press so much in practice. The average of work for the native mill is, in my opinion, three matas while with the Bahea sugar mill six matas in twenty-four hours is the usual amount of work done, and would be increased to eight if the supply of cane and bullocks could be continued. It certainly does double the work and presses very pure juice and gives perhaps half a chittak of khojha (cut cane) in every matta, while the juice pressed with the native mill contains at least ten seers of it. When boiling, the scum removed from the juice obtained by the Bahea mill, is smaller in quantity than that removed from the juice pressed by the native kolhu. From equal weights of cane the Bahea Mill expresses a greater weight of juice than the native mill ever can, besides this for equal weights of juice of both kinds, the resulting rab or gur from the Bahea juice is greater than that produced from the native mill juice. For every mata of juice the Bahea mill will give an increase of 7 seers of rab or gur, which is besides much purer, better in quality, and larger in grain.

It cannot be denied that the Rohilkhand sugar mills, and the mode of manufacturing sugar followed there, are quite superior to the mills and manufacture of Oudh. Since therefore the Bahea sugar mills are superior to the Rohilkhand mills, they must be much more so to the Oudh mills. When I say Oudh, I mean only the Gonda and Bahraich districts, to which alone my experience extends. The method of pressing sugarcane, and making sugar at those places is, as will appear from the description given below, extremely wretched. The mill is entirely wooden, and has a piston which is about half as long and thick as the piston of the Rohilkhand mill. The kolhu, or the lower grooved log in which the piston works, is higher than the corresponding thing in Rohilkhand. Around the top of this a ridge of mud is made. Little bits of cane are put inside the ridge, and the mill is worked, the piston revolving round itself. While the mill is thus working a man is continually beating in the cane by a small wooden hammer. A very small quantity of the juice is thus expressed. The refuse (khoee) is then taken out of the mill, and carried to small beds plastered with tank clay, where it is allowed to soak in warm water for some time. When it is thoroughly soaked people come and, taking handfuls of it, squeeze it between their palms; and collect the water thus expressed (called pancha) in a reservoir constructed for the purpose. This mixture of mud, water, and cane juice is then mixed with the genuine juice obtained before, and is then subjected to a very slow evaporation in dirty shallow pans. The result is the production of that black miserable looking stuff known as gur in Oudh.

The sugarcane generally cultivated in Oudh is of a red kind known by the name of chann or chani in Rohilkhand. It is very hard and does not yield much juice, particularly when pressed by the above-mentioned mills. In my opinion one-fourth of the whole juice is ultimately left behind in the refuse, so that if the Bahea mills are adopted in Oudh the thing would undoubtedly pay well, and the gur or rab would to a certainty improve. There is no doubt that the purchase of the Bahea mill is not within the reach of every common cultivator, but then the inventors of the mill have started their agencies in almost every large station, and the mill can easily be hired at the rate of eight or ten annas per diem. This practice of hiring mills has greatly been encouraged this year in the Shahjahanpur district, through the exertion and kind advice of Mr. Porter, the Collector, and the result of this experiment has been that many persons have purchased these mills, and many will, no doubt, buy them next year.

SEED GRAIN SOWING.

THE advantages of thin sowing are not sufficiently appreciated in North-West India, though it follows that if instead of two maunds, one maund of seed is sown, one maund is saved for food to the people. I cannot do better then quote the experience of the most famous of English experimental farmers Mr. Mechi on this point. He says :—" For years I have drilled one bushel (60lbs. = 30 seers) of wheat per acre as my general quantity, and the effect of this comparatively moderate seeding is to produce such large ears that I am frequently asked what wheat it is, and how the ears become so large. The fact is that millions of money are lost by over thick seeding." The usual amount of seed sown in England is 2 or even 3 bushels (120 to 180 lbs. or 1½ to 2¼ mds.,) and the reasons given by ignorant farmers for such thick sowing were, that a large quantity of seed was necessary to allow for much being consumed by birds, and otherwise lost, and also to keep down weeds. But Mr. Mechi argues that, when a less quantity of seed is drilled in, and the soil kept clear of weeds (as is of course easier in fields sown with the drill than in those sown broadcast), every grain has the opportunity of growing, and the plant of *tillering* (that is throwing out numerous stalks, to one seed), so that instead of a return of 8 for 1, which is a good average crop for India, you would get 50 for 1 easily. The plants would not crowd each other, but would grow up thick and strong, each on his own little area of soil. Mr. Mechi once counted 57 stems from one grain containing 4,500 grains. He says, look at trees, when you see two trees growing close to each other no branches are formed between them, or the branches wither and perish, they want air and light. The same with wheat plants, when planted thick, unable to get air and light, they grow up high with weak stems, and heavy heads. The first high wind or rain, down they go, unable to support themselves, or to obtain support from their neighbours. Mr. Mechi says the seeds should be dropped in a hole at intervals of 9″ by 4″ if the birds can be kept off the newly sown seed. But, he adds, that the question of sufficient space depends on time of sowing, climate, and fertility of soil. Now in India we only sow wheat at one time. The climate, it is true, varies in Meerut, Rae Bareli, and Gorakhpur, but there the wheats sown in various part have become acclimatised to those parts as regards fertility. Wheat is generally sown in the best soil, so that every grain will have the very best chance of growing, as Mr. Mechi says it should, 40 for 1. But, he says, " let every man try, and compare on a moderate scale, and so arrive at sound conclusions."

A very important point, connected with this subject, is the selection of good seed. We all know that even the best seed is mined with bad and small sized grains, sometimes too with peas, gram, barley or mustard, often too with much dirt. To obtain the fullest return of the *best* grain, you must get rid of all these, and sow only the largest grains unmixed with any foreign matter, which sometimes amounts to 15 per cent. The result of

experiments at the Cawnpore farm, on two precisely identical fields, was to give an out-turn of 13½ maunds of grain, and 22½ maunds of bhusa, to the acre, on the field sown with uncleaned grain, and 17¾ maunds of grain, and 26¾ maunds of bhusa, on that sown with cleaned grain, an increase in grain of over 30 per cent. The bad seed, and other foreign matter, should be removed by a sieve of wire netting, which can be procured from the Cawnpore farm at a small cost. But of course your seed will thus cost a little more than the bazar rate, only for the latter you get a large proportion of what you don't want, dirt, peas, mustard, and so on. If you wish to grow wheat to compete with American wheat, of which enormous quantities are shipped to England every year, you must do as they do in America, grow only the best qualities of wheat, and of wheat unmixed with anything else. Indian wheat, specially the soft white wheat of the Meerut Division, is already well known, and fully appreciated in England, and has been classed as equal to, if not superior to, any European wheats, by Dr. Forbes Watson in his classification of samples sent him by me in 1878. Your good wheat fetches as high a price as any English grown wheat, but Indian wheat has a bad name from its impurities, I therefore recommend you to select from your wheat fields the best ears; from them sift out the largest grains, thoroughly prepare your soil as your best cultivators do now, drill your wheat in fairly early, at the rate of 1 maund per acre, or even ¾ maunds, hoe out the weeds, don't trust to the wheat plant keeping them down, and you will obtain a return of 40 for 1, instead of 8 for 1. One more word of warning; where there is great danger of frost, which you know injures the roots of the wheat plant, a drill is used in Madras which I will get up for you—the safest plan would be to sow thick (as you do now), and subsequently thin out the plants when the frosts are over: but recollect that you should, by careful experiment, feel your way to the proper minimum quantity of seed suited to your soil and climate. Begin with an acre next year, and extend your operation as success seems to encourage you.

MANURE.

MANURE is food for plants. As the natural manure on land gets gradually exhausted by continual cropping, artificial manure becomes necessary. This is well known to cultivators, and as far as their circumstances permit, they always use manure. It has been estimated that about one-fifth of the total cultivated area of the province is manured, either regularly, or occasionally.

The chief ways in which land is artificially manured in these provinces are :—

(1.) From the farm yard muck heap.
(2.) By human excreta.
(3.) By the herding of cattle, or sheep.
(4.) By various nitrates (for tobacco *e. g.*)
(5.) By the refuse, leaves, or roots, of a previous crop, or green manuring.

The principal ingredient in the farm yard muck heap is the dung of the cultivator's cattle, of which however only that part is used for manure which is collected during the rains, when the moisture of the atmosphere does not permit its being dried for fuel. In all other months the dung is used for fuel, and the ashes are only available for manurial purposes.

The ashes are not so valuable a manure as the dung itself, and hence there is great loss to agriculture. But, until some other substitute can be found for burning purposes, it is not known how the dung can he made available for manure. Arboriculture on all spare land is therefore highly recommended.

In the meantime, various experiments are made on the Government farms, to find out useful artificial manures. The results of experiments made at the Cawnpore farm led the Department of Agriculture and Commerce to recommend to cultivators the use of bone dust and cattle urine, and the following is an extract from the circular issued on the subject.

A. BONE DUST.—The great increase in produce, which results from the use of crushed bones as manure, seems quite unknown to the people of this country, although in England bone dust is extensively used, and paid a high price for (Rs. 3 a maund). On the Cawnpore farm during the last rabi reason bone dust applied at the rate of 3⅓ maunds to the acre, gave a wheat crop of nearly 24 maunds of grain, and 35 maunds of *bhusa* to the acre, which was 8¾ maunds of grain, and 15 maunds of *bhusa*, more than was gained form unmanured land. Hence the value of the 3⅓ maunds of bone dust was at least Rs. 21. In this experiment the bone dust was mixed with sulphuric acid which makes it far more rapid in its effect, but also increases its cost very much; made in this way it cost Rs. 3-7-3 a maund, but still

gave good profits. The acid has to be imported from Calcutta, and is difficult to obtain ; so, in trying the experiment, it will be better to use bone dust by itself, and apply 5 maunds to the acre instead of 3½. But, in this case, the effect must not be expected, till the second season after the application, although it will continue for 4 or 5 years after the application of the manure. The bones should be crushed in a *surki* mill (dhekoli) worked by 3 men, the crushed pieces should be sifted, the finely powdered dust set aside for use, and the larger portions re-crushed till they are reduced to powder. Three men should make at least 30 seers of bone dust a day, and its cost should not therefore exceed 10 or 12 annas a maund. The crops for which it will be found most useful are, maize, sugarcane, wheat, and barley.

B. Cattle urine.—It does not appear generally known, that the urine of cattle is far more potent manure than their dung, and in consequence cattle urine is allowed to run to waste in this country. In Europe it is carefully collected by keeping bedding of grass or straw under the cattle in their sheds, which absorbs all the urine as it falls, and which, when rotted, is applied to the land as manure.

In this country, it is inadvisable to use bedding, since in the hot weather and rains, it harbours insects, and rots the feet of the bullocks, but I recommend that an attempt be made to collect cattle urine in the following manner. Have the floor of the bullock shed sloped of to a pit in one corner, and well rammed with clay, so as to let the urine drain off into the pit. Keep the pit half filled with loose earth, taking out as much of it as is saturated with urine, say once a week, and replacing it with dry earth.

The earth saturated with urine should be kept for 3 or 4 months, and then applied to one half of a field, and its effect in increasing the produce judged of by comparison with the other half.

Great benefit may be obtained by ploughing in a green crop ; the soil is opened out and made porous, whilst the rotting vegetable matter supplies manure. Leguminous crops are usually employed for this purpose, and in India indigo is the best that can be used. The cultivator is reluctant to, as he thinks, lose a certain crop for a prospective benefit, but the experience of the best farmers in the world guarantees the advantage of the plan Indigo exactly fulfils the conditions required by Mr. Mechi, it costs little for seed, requires only one ploughing, and little further attention, and supplies much nitrogen to the soil.

Memo. regarding irrigation of roadside Trees by means of Barrel Water Cart.

1. A note on the sub-surface irrigation of seedlings by Captain F. G. Hall, R. E., was published with Circular 2 (Arboricultural), dated 26th February 1880.

2. I have tried planting out roadside trees under the system described in the Rae Bareli Municipality with marked success.

3. The above Circular gives the estimated cost of watering such trees in plantations by coolie labor, but of course after the trees have been placed in thalas on roads, the cost of the "ghara fed" system would be increased owing to the much greater distance water has to be conveyed.

I find that the use of a barrel water cart (which I submit for inspection) greatly economises the labor and cost of watering.

The cart consists of an ordinary rum or bear barrel, fixed on a frame work with a pair of ekka wheels, and having a leather hose-pipe. The cost of the whole is about Rs. 20.

The barrel contains about 6 mussuks (average size) of water, and two coolies working with it, can easily do as much watering as six bhisties.

The reduction of establishment thus effected will repay cost of cart in the first month, and subsequently the annual cost for the same amount of irrigation will be Rs. 96 instead of Rs. 360.

N. A. GARSTIN,
Secretary, Municipal Committee.

RAE BARELI,
2nd March 1881.

ARBORICULTURE.—AVENUE PLANTING.

I.—This Memo. does not pretend to throw any light from an arboricultural point of view on the best mode of planting trees either in avenues or groves. It will only sketch briefly the method which has been adopted in the Gondah district for making a small grant go a long way.

II.—The grant made by the Agricultural Department is Rs. 500, per annum only, and as it was found from experience that, when avenues were planted out by Government agency direct, each tree cost from first to last at least Rs. 2, it was clear that the district officer could not hope to make any respectable show on district roads until after the lapse of many years. Roughly at this rate only a little more than one mile of road could be planted out each year.

III.—The plan adopted to meet this apparently hopeless case was one suggested to me by Major Noble, and it has met with such complete success that I have been asked to place the results on record.

IV.—It was determined to enlist the co-operation of the zamindars and cultivators, through whose lands the roads run, in the work. To this end a proclamation was issued along a selected road that all zamindars, pattidars and cultivators, of lands along the line, might apply for permission to plant, the conditions being as follows :—

V.—1. Only trees of certain classes named in the proclamation are to be planted.

N. B.—A further condition should have been made that no seedlings of less than two years growth should be planted.

2. The trees must all be properly protected by "thalas" of prescribed pattern.

N. B.—It is necessary to insist on a really good thala been made. For Gondah a mud thala of 6 feet diameter, interior measurement, with three feet walls, and a one foot ditch out-side, has been adopted. No thala of any less diameter is of any use, as the cattle can get at the top of the young tree over the wall, if the stretch is less than three or three and a half feet.

3. The trees are to be inspected by the Tahsil Officers during the cold season succeeding the rains in which they are planted, and if they are found to be in good condition, a "sanad" will be given which will secure to the planter full ownership in the tree, save the power of lopping and felling.

Note.—The sanad gives full details of the kind of trees, the situation with regard to the Khasrah numbers of fields near which they are planted, and also embodies conditions Nos. 4, 5 and 6.

4. If the planter allow a tree to die and does not plant another during the ensuing rains, the right to replant will be forfeited, and the Deputy Commissioner will make his own arrangements for filling the vacant thala.

5. If the Deputy Commissioner wishes to lop, the planter can take the loppings.

6. If the Deputy Commissioner wishes to fell, which of course will very rarely be the case, the planter is to be compensated to the extent of the value of the tree felled.

7. To all planters who act up to these conditions, and whose trees and thalas are approved of on inspection, a bonus of 4 as. per tree will be given.

8. A Register will be kept at the Tahsil in which all the particulars entered in each man's sanad will be shown, and in which will also be recorded any transfer that may take place.

VI.—The reponse to the invitation, thus set out in the proclamation, was, in all zamindari and pattidari villages, so satisfactory, that in many cases it was found necessary to arbitrate between parties contending for sites for trees, and although it was not until August 1879, that the first notice was issued, I found on going down the selected road in December that no less than 10 miles had been more or less completely planted out.

VII.—The same plan was followed in 1880, and the result of the experiment up to date is that about 22 miles of road have been planted at a cost of Rs. 760.

VIII.—Experience has shewn that in independent villages the planters take the greatest care of the trees which they have taken the trouble to plant, and in such villages the experiment may be pronounced a complete success.

IX.—In Talukdari villages however the landlords jealous of the tenants, have attempted to plant out the road running through their properties by direct agency. In these villages the eye of the owner is wanting, and the trees fare little better than those hitherto planted out by Government. On the other hand Talukdars do not require the 4 as. bonus, and we therefore get the benefit of such trees as do survive free of cost.

X.—In future, lengths of road will be selected which for the most part run through independent villages.

XI.—I think that the results generally shew that the system, based as it is on the expectation that a man who will take the trouble to plant, will also exert himself to protect and nourish, will work well, and secure the speedy plantation of our district roads at a comparatively trifling cost.

HENRY S. BOYS,

Lucknow, 12th March, 1881.

NOTE ON ARBORICULTURE.

THE question of Arboriculture is one of much importance as regards the well being of the country. It is one of the important elements in the agricultural stability of the country from the fact that trees counteract the fearfull aridity of the climate in the hot countries and supply vegetable manure from their decayed leaves. The duty has been assigned to this Department of superintending the arboricultural operations of the country. The gardens of Lucknow and Saharunpur are placed within its supervision for the purpose of assisting in this great object Nurseries are established every where in convenient localities, new and useful trees are distributed and instructions given (of which a copy has been printed) for arboriculture so far as it goes at present; *i. e.* to the planting and maintenance of roadside avenues and groves. It is unnecessary for me to urge on landlords the benefit that results from planting trees. In renewing the operations of last year I was able to say as follows :—

Attempts are now being made in several districts to induce the zamindars and cultivators to plant trees on condition of their being allowed to use the fruit and dead wood. It is well known that Hindus consider the work of affording shade to wayworn passengers an act of great piety. On this consideration a few miles of the Basti—Jaunpur road have been planted by a rich merchant with the hope of being blessed with a son in return for his good deed. This system has worked very well in the Gonda district, where "the cultivators and pattidars came forward eagerly to obtain permission to plant, and so complete was the success of the scheme that on examining the state of the trees and thalas it was found that far more had been planted than could be paid for out of the year's grant. The talukdars who planted do not require any payment." The Deputy Commissioner of Rae Bareli also hopes that the scheme will succeed in his district. He writes :—"In this district the poorness of a great deal of the soil and the great prevalence of white-ants make the maintenance of avenues somewhat difficult, but from the excellent spirit which prevails among the talukdars and zamindars, it is hoped that success will be achieved in the course now being entered on of getting gaps filled and avenues planted by the owners instead of by Government. In Mathura too, the trees on the greater part of the Mathura—Dig road were planted by private persons who look after them and take the fruit and dead wood. Last year the Collector directed them to fill up the gaps, in which direction they did something, but not in a satisfactory manner. In the Cawnpore district the zamindars have planted 4,847 trees. In Bareilly Lala Damodar Das has earned the special thanks of the Collector for his liberality in the direction of the tree-planting, and in Mr. Reid's opinion deserves the approval of Government for his generous action. Considering the small amount of money that can be allotted to each district from the Government grant, this system will prove a great boon to the arboriculture cause if it can be extensively introduced into other districts. Constant efforts will be made in this direction.

We have here shown what has been done, and what can be done, and what Government hopes will be done. I may mention that the cultivation of fruit trees is specially encouraged by Government to afford some addi- to the food supply in time of famine. If shade and food can be provided together so much the better. Ornamental trees are not wanted like the Kachhnar or the Siris, and trees that are only useful for their wood like Nim and Shisham, only hold the second place though there may be localities where fruit trees won't grow (as mangoes will not round Agra), and here the cultivation of neem and shisham is necessarily permitted. But the lining your roads with shade giving trees, and the planting of baghs, however meritorious, is not the only direction in which your efforts should be directed. The subject of arboriculture is intimately connected with agriculture especially in this country, for an increased quantity of wood for fuel will allow of an increased quantity of the dung of cattle being applied to the ground as manure. We heard the other day that cultivation with Canal water was successful when sufficient manure was given to the soil: but the cultivator has not got it to give: he must cook his bread with it and the soil only gets the ashes and sweepings of his house. For this reason every zamindar should plant fuel-plantations wherever possible about his estate; waste land, that is not very badly impregnated with salts will very soon give a crop of babul. All waste spots should be utlised for this purpose, for instance the banks of the canal that passes through Lucknow might be planted with a dense growth of brush wood for fuel. It is only necessary to guard the trees for 3 years from goats and cattle. Enough fuel would be grown to supply the city of Lucknow altogether. You can begin thinning after 3 years, and then a certain income is realised yearly, and I remember in a Court of Wards estate under my charge the thinnings only of a moderate plot of land gave over Rs. 2,000, whilst I was told the previous owner had cleared Rs. 16,000 a few years before. Recollect too that though you have to protect the trees for a few years, for ever after you get good grazing for your cattle under the trees, for the dropping leaves make the ground however bad fertile and able at least to bear grass. I cannot too strongly urge on zamindars the planting of their waste plots with fuel trees such as dhak (or palas) babul, *chenkar*, &c. The moister climate of the northern districts makes the cultivation of trees there much more easy, but it is the duty of every zamindar, however dry his district may seem, to plant trees: there are trees that will stand any amount of heat especially if cared for at first. This Department offer every assistance to those who ask for it, helps them to get seed and gives advice and instructions when required. There is however very little to teach in this matter, it simply wants you to realise the paramount importance of doing something to unclimate the climate, to add to the food supply and to improve the agriculture of the climate by the manure supply now used for fuel.

(Sd.) F. N. WRIGHT,
Officiating Director.

APPENDIX E.

1. Report of the Sub-Committee in charge of the cattle Department, by Mr. J. B. Fuller, C. S., Assistant Director Agriculture and Commerce, together with prize list.

2. Report of the Sub-Committee in charge of the Implement Department, by Mr. W. J. Wilson, C. E., together with prize list.

3. Report of the Sub-Committee in charge of the exhibits of grain and agricultural products by Mr. J. Harrison, C. S., together with prize list, together with catalogue prepared by Mr. F. N. Wright, C. S., Director of Agriculture and Commerce.

4. (*a*) Report of the Sub-Committee of the Arts and Manufactures Department by Mr. W. Hoey, C. S., together with prize list.

(*b*.) Ditto by Mr. A. Constable, O. & R. R., on Printing in Oudh.

Report of the Sub-Committee appointed to judge the Cattle.

Members. { RAJA AJIT SINGH.
LALA RAM SHANKER, Naib of the Maharaja of Balrampur.
PANDIT RAJ NARAIN, of Alamnagar.
J. B. FULLER, ESQ.

The total sum of money placed at the disposal of the Committee and the several classes of animals for which it was allotted are shown below :—

	CLASS.		*Total allotment.*
I.	Plough bullocks	Rs.	375
II.	Bulls	,,	425
III.	Cows	,,	150
IV.	Calves	,,	100
V.	Plough buffaloes	,,	150
	Total	,,	1,200

No provision had therefore been made for cart and *rath* bullocks, since strictly speaking, they are not agricultural cattle. But a very large number of bullocks of this description were exhibited, many of them being of conspicuous excellence, and the Committee therefore determined to frame a VITH Class, which would include them, and to allot some extra prizes out of the surplus unawarded under the other classes.

Prizes were only awarded when they appeared to the Committee to be well deserved, and it was not thought fit to distribute all the money, which had been allotted, simply because it was available for distribution. In consequence, even after allowing for the extra prizes awarded under the VITH Class (for cart and *rath* bullocks) there was a saving of Rs. 375 on the total prize allotment.

The subjoined table shows the total number of cattle exhibited, grouped class by class, and also according to the divisions from whence they were sent :—

	NUMBER OF ANIMALS SENT FROM				Total number exhibited.
	Sitapur Division.	Lucknow Division.	Fyzabad Division.	Rae Bareli Division.	
Class I. Plough bullocks ...	15	40	25	33	113
,, II. Bullocks ...	1	2	5	1	9
,, III. Cows ...	...	6	10	5	21
,, IV. Calves ...	2	4	9	7	22
,, V. Buffaloes ...	1	...	4	6	11
,, VI. Cart & *rath* bullocks,	10	7	23	17	57

It will be noticed that nearly the whole of the exhibits (73 per cent.) are engrossed by classes I and VI (plough and cart bullocks), the entries under the other four classes being extremely few. It is principally owing to the scant exhibits under the classes of bulls, young stock, and plough buffaloes that the total number of cattle fell considerably short of what, in the opinion of the Committee, it might have been, and it is to be hoped that in subsequent years the number of cattle exhibited under these important classes may greatly increase. It is from the character of the *bulls* and *young stock* that most can be gathered concerning the condition of cattle breeding in a district, and the Committee are much in favour of anything which would tend to encourage the breeding of buffaloes on account of their fitness for performing the heavier classes of work (*e. g.*, deep-ploughing) which form one of the principal features in agricultural improvement.

The *plough bullocks* exhibited were fairly numerous, and justified the reputation which the Tarai to the north of Oudh has obtained as a breeding district. Some animals of the breeds known as *Rassia* and *Chandpara*, short, well knit, dark grey cattle, were especially good, and all four first prizes and both the medals awarded for plough cattle were taken by animals of these breeds. From their size and character they appear well fitted for being crossed with the Mysore breed, which would add considerably to their power of speed and endurance. But so far indeed as size, strength, and "breeding" are concerned, they appear to compare not unfavourably with Mysore cattle, and it is perhaps a question whether Mysore Bulls could stand the malarious climate of the tracts, where these cattle are bred. But the majority of the plough cattle were extremely small, notably those bred in the Partabgarh and adjoining districts, and although it is said that they work with a good deal of spirit, yet it is impossible that with such undersized cattle any progress can be made towards agricultural improvement in the form of a deeper cultivation of the soil. If home breeding of cattle is to be attempted in these districts, instead of their depending on importation from tracts outside them (as is now in great measure the case in the more thickly populated districts of the Ganges-Jumna Doab) then size is a matter which requires great attention, and this will probably be attained as much by the extension of grazing grounds, and the more general cultivation of fodder crops, as by any efforts made to increase the size of the bulls.

The *bulls* exhibited were very few in number, possibly because the generality of those in the most thickly populated tracts being Brahminy Bulls, (*i.e.* let loose on a Hindu ceremonial occasion) there were no owners who would take the trouble of catching them or who could claim the right of exhibiting them. There were three or four of these Brahminy Bulls shown which were of considerable merit, and the Committee consider that one of the directions, in which most improvement can be looked for, is the gradual improvement of the class of animals which are let loose in this way. Zemindars and others should be impressed with the importance of selecting a fine animal to exercise their piety upon, and it is possible that considerable improvement might result in this way to the breeds of village cattle. The two finest Bulls exhibited were those shown by Captain Gulab Singh of the Rae Bareli district, and by the Maharaja of Balrampur, both of which, how-

ever, seemed too large for the cows of the country, and were if anything, larger than the average run of the Bulls bred at the Hissar Cattle Farm, which, it is generally complained, are unsuitable from their size for use in Oudh.

The *cows* were few in number, and, generally speaking, poor in quality ; the prize winners were, in every case but one, the property of Talukdars, and were animals kept as milch cattle, and not primarily for breeding purposes. The *calves* were also far from numerous, and not noticeable for quality. No *plough buffaloes* worthy a prize were exhibited, and it is a matter for surprise that such small use appears to be made in Oudh of these useful animals. They could he bred with great success in the damper districts adjoining the Tarai, and are in some respects the best draught cattle in the Provinces for heavy plough work. If they be used, no complaints can ever be made of the impossibility of drawing an English or American plough.

Perhaps the best cattle which were exhibited fell under the sixth class *i. e.*, cart and *rath* bullocks. Some of the Oudh bred cattle were excellent, and a comparison between the cattle included in this class and those classed as plough bullocks, seems to show that the finer kinds of bullocks are much less used for agricultural operations in Oudh than in some parts of the North-Western Provinces, a far larger proportion of the better classes of cattle appearing to be monopolized for carts and *raths.*

The Committee recommended the following gentlemen for certificates as having by their exhibits greatly contributed to the success of the show, all are prize winners in some one or other of the classes.

The Maharaja of Balrampur.
Raja Lal Madho Singh of Garh Amethi.
Raja Jag Mohan Singh of Chandapur.
Raja Shanker Baksh of Kajur Gaon.
Raja Kishen Datt Panday of Gonda.
Raja Partab Narain Singh of Mehidauna.
Raja Amir Hassan Khan of Mahmudabad.

Medals were awarded to the following exhibitors for cattle of conspicuous merit.

LIST OF MEDALS AWARDED.

I.—FOR PLOUGH BULLOCKS.

Shahban Ali of Salempur.
Naurang Singh of Kesarganj.

II.—FOR BULLS.

Captain Gulab Singh of Rae Bareli.

III.—FOR CALVES.

Rai Madho Partab of Dalippur.
Diwan Ran Bijai Bahadur of Kutna.

IV.—FOR CART BULLOCKS.

Raja Indar Bikram Shah of Kheri.

V.—FOR HAVING GAINED TWO PRIZES IN DIFFERENT CLASSES.

Thakur Bharut Singh of Hataura, Hardoi.
Pandit Raj Narain of Alamnagar.

The following money prizes were awarded under each class in addition to the above certificates and medals.

CLASS I.—PLOUGH BULLOCKS.

First prizes, worth Rs. 25 each.

* Shahban Ali of Salempur.
Dina Bahra from the estate of Sirdar Heera Singh.
Mahesh Baksh, Nanpara.
* Naurang Singh, Kaisarganj.

Second prizes, worth Rs. 20 each.

Kalesar Halwai, Man Mohanganj.
Parwari Kalwar, Mallapur.
* Thakur Bharut Singh, Hardoi.
Thakur Sheu Baksh Singh, Katesar.
Rai Sarabjit Singh, Bhadri.
* Pandit Raj Narain, Alamnagar.

Third prizes, worth Rs. 10 each.

Zar Mohammed Khan, Nanpara.
Pandit Raj Narain, Alamnagar.
Babu Mahesh Baksh, Partabgurh.
† Raja Lal Madho Singh, Garh Amethi.

Fourth prizes, worth Rs. 5 each.

Goberdhun, Garra Nanpara.
Nunda Ahir, Bhadri.
Bhola, Partabgurh.

CLASS II.—BULLS.

First prizes, worth Rs. 50 each.

* Captain Gulab Singh, Rae Bareli.
† Maharaja of Balrampur.

Second prizes, worth Rs. 40 each.

None awarded.

† *Third prizes, worth Rs. 25 each.*

Raja Kashi Parshad of Saseri. } Both branded as Brahminy bulls and therefore (strictly speaking) ownerless.
Ujagar Gararia, Kesarganj. }

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* Medallist.
† Recommended for certificate.

CLASS III.—COWS.

First prizes, worth Rs. 15 each.

† Raja Jag Mohan Singh, Chandapur.
† Raja Shankar Baksh, Kajurgaon.
† Raja Kishen Datt Panday, of Gonda.

Second prizes, worth Rs. 10 each.

Raja Kishen Datt Panday, of Gonda.
Lal Bhagwat Singh, Ataha, Partabgarh.

Third prizes, worth Rs. 5 each.

Babu Shiu Parshad, Lucknow.

CLASS IV.—CALVES.

First prizes, worth Rs. 10 each.

Nida Kurmi, Rae Bareli.
† Maharaja of Balrampur.
† Kuar Partab Narain Singh.
* Rai Madho Partab, Dalippur.
* Diwan Ran Bijai Bahadur, Kutna.

Second prizes, worth Rs. 5 each.

Budhu Pasi, Hilgi, Lucknow.
Ala Baksh, Nur Hussainpur.
Ganesh Bujua, Garra Nanpara.

CLASS V.—PLOUGH BUFFALOES.

No plough buffaloes deserving a prize were exhibited. The Committee however adjudge an extra prize of Rs. 15, for a fine cow buffalo exhibited by Gulam Hussain, Sitapur.

CLASS IV.—CART AND RATH BULLOCKS.

First prizes, worth Rs. 30 each.

Mahadeo Kurmi, of Nanpara.
* Raja Indar Bikram Sah, of Kheri Biswa.
(one prize for 2 yokes.)
† Raja Amir Hassan Khan, Mahmudabad.
Raja Partab Narain.

Second prizes, worth Rs. 20 each.

Raja Biseswar Baksh, Rae Bareli.
Shahban Ali Chaudhri, Salempur.
Bhagiratt Kalwar, Kesargang.
Raja Lal Madho Singh, Garh Amethi.
† Raja Jag Mohan Singh, Chandapur.

Third prizes, worth Rs. 10 each.

* Thakur Bharat Singh, Hataura, Hardoi.
Thakur Daryao Singh, Biswan, Sitapur.
Rani Harbans Kuar, Tiloi, Rae Bareli.

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* Medallist.
† Recommended for certificates.

The Committee in conclusion venture to suggest that in succeeding years the animals should be arranged in the Exhibition sheds by classes, and not by districts as was the case in the present show. It is obviously impossible to judge of the relative merits of different animals except by placing them side by side, and the judging committee would be much assisted in doing this if all the animals in each class were grouped together to start with.

A complete return of all the cattle exhibited, showing class by class, and district by district, is appended to this report, which may be found of service in subsequent years for purposes of comparison.

TABLE.

Showing the Districts from which the Cattle were exhibited were drawn.

District.	Plough Bullocks.	Bulls.	Cows.	Calves.	Cart and Rath Bullocks.	Buffaloes (including cows.)	TOTAL.
	Head.	Head.	Head.	Head.	Head.	Head.	Head.
Lucknow	23	1	4	4	2	0	39
Bara Banki	4	0	0	0	2	0	6
Unao	8	1	2	0	3	0	14
Total Lucknow Dn.	40	2	6	4	7	0	59
Fyzabad	0	0	1	2	2	0	5
Bahraich	17	2	5	4	12	4	44
Gonda	8	3	4	3	9	0	27
Total Fyzabad Dn.	25	5	10	9	23	4	76
Sitapur	4	1	0	0	2	1	8
Hardoi	7	0	0	0	2	0	9
Kheri	4	0	0	2	6	0	12
Total Sitapur Dn.	15	1	0	2	10	1	29
Rae Bareli	8	1	3	5	15	0	32
Sultanpur	9	0	1	0	0	1	11
Partabgarh	16	0	1	2	2	5	26
Total Rae Bareli Dn.	33	1	5	7	17	6	69
Grand Total	113	9	21	22	57	11	233

J. B. FULLER, C. S.

Report of Mr. W. J. Wilson, C. E., on Machinery and Implements at the Lucknow Agricultural Exhibition, on 8th, 9th, and 10th March 1881.

I HAVE been asked by Mr. Wright, Officiating Director of the Department of Agriculture and Commerce, to write a short note on the machinery and implements at the Exhibition.

2. The water-lifts were tried on the afternoon of the 8th instant. To compare the discharges of different water-lifts five masonry wells were sunk on the bank near the river, and pipes were laid from the wells to the river about 18 inches below the water surface. The water was discharged into masonry tanks. Those near the 12½ feet wells contained 100 cubic feet each and those near the 19½ feet well only 50 cubic feet. To find the discharges of pumps for 5 feet lift and of the swing bucket, two tanks each containing 200 cubic feet were made close to the river.

Three chain pumps with iron pipes were exhibited by the Director Department of Agriculture and Commerce for lifting water 65, 13 and 20 feet respectively. A wooden chain pump for lifting water 8 feet was exhibited by Raja Amir Hassan Khan, of Mahmudabad. The ordinary *dhenkli* or lever lift worked by one man, and the single bucket worked by a pair of bullocks and two men, were also shown.

The following results were obtained :—

(I.) Height of lift 12′ 6″.

A 2½ inch chain pump worked by two men raised 100 cubic feet of water in 12 minutes.

The single bucket worked by a pair of bullocks and two men raised 100 cubic feet in 21 minutes. Capacity of bucket = 2·7 cubic feet or 16·9 gallons. The *dhenkli* worked by 1 man raised 100 cubic feet in 50 minutes. Capacity of earthen pot = 0·4 cubic feet or 2·5 gallons.

(II.) Height of lift 19′ 6″.

A 2½ inch chain pump worked by two men raised 50 cubic feet in 9 minutes.

The single bucket worked by a pair of bullocks and 2 men raised 50 cubic feet in 11 minutes. Capacity of bucket = 2·7 cubic feet or 16·9 gallons.

(III.) Height of lift 4′ 6″.

A 2½ inch chain pump whereby 2 men raised 200 cubic feet of water in 12 minutes.

A swingbucket worked by 2 men raised 200 cubic feet of water in 15 minutes.

(IV.) Height of lift 8′.

The wooden chain pump exhibited by the Raja of Mahmudabad, worked by 4 men, raised 200 cubic feet of water in 14 minutes.

The Committee have awarded a certificate to the Director, Department of Agriculture and Commerce, for the best pump, and another certificate to Raja Amir Hassan Khan for the second best pump.

3. A Threshing mill and two winnowers were exhibited by the Department of Agriculture and Commerce. The threshing machine was made by Messrs. Ransom Sims and Head, of Howrah. It was worked by means of a Railway bullock power from Mr. Minard Harder, of Cohliskill, New York. With this power, which is on the treadmill principle, two bullocks worked the threshing mill as well as four bullocks turning a gin. The Committee have awarded certificates to Messrs. Ransom Sims and Head for their threshing mill, and to Mr. Minard Harder for his Railway bullock power.

One of the two winnowers exhibited was made by Messrs. W. R. Dell & Sons, London, costing Rs. 250. The other was made at the Agricultural Workshops, Cawnpore, and cost Rs. 30. The latter works as well as the former, but is not so desirable. The first place has been awarded to it on account of its good working, cheapness, and consequent fitness for the country.

4. The silver medal for the best sugar mill has been awarded to Messrs. Mylne & Thompson of Bihea, Shahabad, Bengal. This firm exhibited the following mills :—

(i.)	With	two	rollers,	4″	in diamtr. and	4½″	long,	price	Rs.	45
(ii.)	,,	three	,,	4″	,,	4½″	,,	,,	,,	55
(iii.)	,,	two	,,	7″	,,	6″	,,	,,	,,	85
(iv.)	,,	two	,,	7″	,,	8″	,,	,,	,,	95
(v.)	,,	three	,,	7″	,,	8″	,,	,,	,,	115

Messrs. Thompson and Mylne recommend the three roller mills for crushing thick sugar cane. The small rollers have been made to bring the mill within the reach of the poorer class of zemindars. The mills were worked during the Exhibition, and some *gûr* of very good quality was made. To boil the juice a shallow pan 5 feet in diameter and 3 inches deep was used, the advantages claimed for it over a deeper pan being that there was less danger of burning the sugar.

A sugar mill with conical rollers from Messrs. Cantwell & Co., of Calcutta, was in the Exhibition, but was not worked. There was also a small mill with 3 vertical wooden rollers exhibited by Mahomed Mohsan Ali, of Amroha, and a model of the Punjab mill with horizontal rollers.

5. The plough trials were originally fixed for the evening of the 9th, but as Mr. Wright considered the time allotted insufficient, they were put off to the morning of the 11th. In awarding the prizes the following points were considered.

(I.) The construction of the plough with reference to—

a. Simplicity, including ease of adjustment.
b. Strength and durability.
c. Capability of repair.
d. Weight.

(II.) The working of the plough as regards—

a. Draught.
b. Depth and breadth of furrow.
c. Inversion of the soil.
d. The balance of the plough.

(III.) The price of the plough.

One plough was worked at a time and marks were awarded for each of the above points.

The prizes awarded are—

(I.) For the best plough. A certificate to the Director, Department of Agriculture and Commerce.

(II.) For the second best plough. The plough made by Mr. Crowley and by Mr. Gavin Jones being considered equal, each of them gets a silver medal.

(III.) Certificates to Messrs. Watt & Co., of Richmond, Virginia, U. S., for their D. and E. single horse plough, to Messrs. Ransom, Sims and Head, of England, for their eagle No. 10 plough, and to Messrs. Howard & Co., of England, for their Indian ryots plough.

Ploughs made by Mr. St. Joseph, of Patna, and by Dr. Macgregor, of the Benares Jail, were also tried.

It should be noted that their comparatively high prices and the difficulty of repairing them if broken, kept the American and English ploughs from taking higher places.

A large number of ploughs sent by cultivators in different parts of Oudh were in the Exhibition, but call for no further remark.

5. A silver medal has been awarded to Mahomed Mohsan Ali, of Amroha, zila Moradabad, for the gular wood piping used by him for tapping the springs in deep wells. Also a certificate to Mr. Garstin, Secretary of the Municipal Committee, Rae Bareli, for the cask used by him for watering trees.

6. Some excellent specimens of earthenware pipes for drainage, and of other earthenware goods were sent by Messrs. Burn, & Co., from the Raniganj Pottery Works. The Committee have recommended that a medal should be awarded for these articles.

7. A number of models of ploughs and other agricultural implements used in different parts of the country were exhibited. Two models of Persian wheels exhibited by the Deputy Commissioner of Rae Bareli call for special notice.

W. J. WILSON.

Countersigned

F. N. WRIGHT,

Offg. Dir., Dept.

Agri. and Commerce.

Report of the Sub-Committee, Agricultural Show, Implements Department.

The Committee appointed to inspect and try agricultural implements recommend the following prizes be awarded.

1. For the best plough, a certificate to the Director, Department of Agriculture and Commerce, North-Western Provinces and Oudh, for the kaiser beam plough.

2. For the second best plough. As the Committee consider that the ploughs made by Mr. Crowley and by Mr. Gavin Jones, both of Cawnpore, work equally well, they recommend that a silver medal should be awarded to each of these gentlemen.

3. For the third best plough a certificate to Messrs. Watt & Co., of Richmond, Virginia U. S., for their one horse D. and E. swing plough, which was exhibited by the Director, Department of Agriculture and Commerce.

The Committee consider that the following ploughs deserve honorable mention.

4. Ransom, Sims and Head's eagle No. 10 Plough, exhibited by Messrs. Coen & Co., of Agra.

5. Howard's Indian ryots plough, exhibited by Messrs. Coen & Co.

6. For the best sugar mill. A silver medal to Messrs Milne and Thompson, of Bihia, Bengal.

For other implements—

(I.) A certificate to the Director, Department of Agriculture and Commerce, for the chain pumps made at the Agricultural Workshops, Cawnpore, as the best pumps exhibited.

(II.) A certificate to Messrs. Ransom Sims and Head for their threshing machine exhibited by the Department of Agriculture and Commerce.

(III.) A certificate to Mr. Minard Harder of Cohliskill, New York, for the Railway bullock power exhibited by the Department of Agriculture and Commerce, and used to work the above threshing machine.

(IV.) A certificate to the Director, Department of Agriculture and Commerce, for the winnower made at the Agricultural Workshops, Cawnpore.

(V.) A silver medal to Mr. J. Wilson, of Cawnpore, for his grain separator.

(VI.) A silver medal to Mahomed Mohsan Ali, of Amroha, zila Moradabad, for the gular wood piping used by him for tapping the permanent spring in deep wells.

(VII.) A certificate to the Secretary of Municipal Committee, Rae Bareli for the cask used by him in watering trees.

(VIII.) A certificate to Raja Amir Hassan Khan, of Mahmudabad, Sitapur, for the wooden water-lift exhibited by him.

(IX.) The Committee also recommend that a silver medal be awarded to Messrs. Burn & Co., Raniganj Pottery Works, for the excellent pipes and earthenware goods exhibited by them. These articles all came together, and were placed among the agricultural implements, and not in the exhibition of arts and manufactures to which they rightly belong.

E. J. MUMFORD,
W. J. WILSON, } Members.
MUNSHI NEWAL KISHORE,

LUCKNOW :
The 15*th March* 1881.

REPORT ON THE AGRICULTURAL PRODUCTS.

Sub-Committee, { RAJA JAGMOHAN SINGH.
RANA SHANKAR BUKSH.
CHAUDHRI KHASLAT HOSSEIN.

The object of the show being mainly directed towards the encouragement of improved agriculture in Oudh, the exhibits were confined chiefly to products of that province, the North-Western Provinces being represented only by samples grown in a few court of wards estates, and by one or two native gentlemen under the advice of the Department of Agriculture and Commerce.

The chief products exhibited were, as might be expected, those for which Oudh is remarkable, *viz.*, rice of which there were no less than 300 samples unhusked, and 150 of husked, wheat came next in point of number, the specimens of the grain amounting to 125, then oilseeds, notably sarson. Of the inferior grains the most numerously represented were urd, arhar, and mung, and in about an equal degree Juwar, and Bajra.

The judging was carried out by grain dealers from the bazar, but these not having been nominated until the day on which the show opend, this task was necessarily performed in a somewhat hurried manner, and hence lacked that care and deliberation which might have been attained had they been selected sometime before the meeting. Taking now the products in detail it will be convenient to refer to them in the order given in section XV. of the printed rules for the exhibition. Wheat naturally claims the first place, and for it no less than 12 prizes were allotted, *viz.*, 4 each for red, white, and other varieties. It might perhaps have been better to have divided the wheats into four groups of white soft white hard, red soft, and red hard, as these will be found to include every description of wheat grown in Upper India, what are classed as other varieties being in reality mixtures of the above prime varieties in different proportions. An apparent exception to this classification were two samples of a short round berried wheat somewhat resembling pearl barley, one labelled *dekhani* the other *valayati*, but both of which, although somewhat harder than soft white wheat, might be included in that group.

Of the collection the number of samples of white wheat considerably exceeded those of red, and in the former class the soft varieties were more numerous than the harder and less valuable sorts. This result might however have been anticipated as, though the four distinctive varieties are cultivated side by side in nearly every district, yet it is well known that northern India produces mainly soft wheats, the hard varieties being grown chiefly in lower Bengal and southern India.

In judging of the merits of different samples of wheat and their respective commercial value, regard should be had, 1st to the purity, that is to

say, the absence of wheat grain of other than those characterising the sample.

2ndly freedom from admixture with other grain such as barley, gram, rape, or peas, and

3rdly absence of foreign matter, *viz.*, chaff, earth, and dirt of every description. Of the samples exhibited the majority complied more or less with the first condition, and were in addition fairly clean, but many of them contained a greater or less admixture of foreign grain.

Turning now to the prizes for white wheat, the first place was awarded to a sample of large white, clean semi-soft, white wheat, with grains of a uniform size, and free from foreign matter—grown by Babu Mahesh Buksh, Talukdar of Dinawar, Partabgarh district. The second prize was taken by Sultan Singh, Talukdar of Akrampur, Unao district, for a specimen labelled "lalia," but which in reality was white wheat. A fine sample but inferior in uniformity of grain and colour to No. 1.

A sample of "setwa" wheat, fine white, small berried, resembling No. 1 grown by Babu Ram Sahai of Unao was awarded third prize. For softness and fineness no sample surpassed that to which the 4th place was adjudged, one grown by Sunait Singh of Senpurah Parah, tenant on the Rawatpur Court of Wards estate from Muzaffarnagar seed, and which but for the admixture of foreign matter, both grain and dirt, would decidedly have taken first prize.

For red wheats both 1st and 2nd prizes were awarded to samples grown in Bulandshahr, one by Syed Mahomed Khan of Daulatpur, the 2nd by Syed Meharban Ali of Gulauthi, native gentlemen, both of whom take a deep interest in the improvement of agriculture. Both the samples were fine large grain, of good colour, but the latter somewhat less clean than the former.

The 3rd prize was allotted to a sample of *lalia* wheat of medium sized grain, semi soft and clean, grown by Syed Ghazaffer Hossain, Talukdar of Akbarpur, Fyzabad, and to a similar specimen, but not quite so clean, as shown by Narain of Mudhua Khan, Sultanpur, was adjudged 4th place.

For other varieties of wheat 4 prizes were allotted, but the samples which obtained 1st and 4th places were really white wheats. No. 1 exhibited by Raja Krishen Datt Ram, Talukdar of the Gonda district, was a large berried wheat, fine, and soft, and known in the North-Western Provinces, and Oudh, as "samdhua." No 4 grown by Bukhtawar, Kurmi, of Huntra, was a semi-hard, white wheat, with a short round grain and known as "muria."

For 2nd and 3rd place two samples were considered equally good and hence a prize of the same value was awarded to each, one grown by Prag Datt of Mozinuddinpur in the Sitapur district, the other exhibited by Wazir Chand, Talukdar of Baragaon. Both were samples of a mixed red white wheat semi-hard and small berried, but with a predominance of white in the former. A specimen of pedigree wheat with a long red berry was exhibited by Syed Mahomed Khan of Daulatpur, Bulandshahr, but it appeared to have

degenerated from the original seed, and could not be compared with many of the finer samples of soft white wheat, and thus furnishing another instance of the advisability of endeavouring by careful selection to improve the finer varieties of indigenous wheat, in preference to attempting to acclimatize seed imported from England or other countries.

The show of barley, of which there were 44 samples, was much inferior to the wheats, and most of them contained a greater or less admixture of other grain, wheat, gram, peas, &c. This is no more than was to be expected, as barley is rarely sown alone, and being a cheap grain, largely eaten by the poorer classes, but little care is bestowed on it's cultivation. Two samples presented a marked distinction to the rest. One of these was a bag of Rasuli barley shown by the Department of Agriculture and Commerce, resembling in appearance wheat more than barley. The other exhibited by Rana Shankar Buksh of Kajurgaon, Rae Bareli. This latter specimen was marked "vilayati," bore a close resemblance to the Rasuli sample, and in quantity was decidedly superior to the country sorts. It failed however to meet the approval of the judges, probably in consequence of its being of a rare description, and also being very much weevilled. It must however be remembered that it is the softest and finest specimens that are most exposed to destruction by that insect. Two prizes were awarded in this class, the 1st to Sarait Singh of Rawatpur, Cawnpore, the 2nd to Thakur Sultan Singh of Akrampur, Unao, both were samples of large good grain, but the former much cleaner than the latter.

Oats.—Excepting inthe Meerut division and in small quantities by Europeans, oats is grown on but a small scale in the North Westen Provinces and Oudh, and hence it was not surprising to find that of last season's produce only one sample was exhibited, and that by Raja Jagat Simha of Bijnor. There were, however, 4 sheaves of oats of the present season, of which one grown at Rawatpur in the Cawnpore district, and one from Rae Bareli shown by Mr. Mumford were remarkably fine. Two prizes were, according to the list, to have been awarded to this class, but in consequence of the competition being so limited, the amount was transferred to maize for which, by some oversight, no prizes had been allotted.

Maize.—Of this grain the samples were numerous, both hulled and in cobs, and embraced three or four descriptions of acclimatised American corn, as well as several of the Jaunpur varieties. Of the former, some cobs of white flint and yellow Canada grown at Awah, and of the latter a sample shown by Syed Meharban Ali of Bulandshahr, deserve mention, but the judges being all bazar dealers, and these descriptions being new to them, all three prizes were awarded for specimens of common country kind. It must however be considered that of their sort those taking the prizes were very fine indeed, being all large grained, of bright colour, and of a very pure white when broken.

Some stalks of cold weather maize shown by the Department of Agriculture and Commerce, but of which the cobs were hardly quite ripe, attracted attention as being something new to the majority of the visitors.

The prizes in this class were adjudged as follows:—

1*st*. To Badri Narain, Gonda district.

2*nd*. To Chalan Singh of Amosi, Lucknow district.

3*rd*. For a sample shown by the Tahsildar of Purwa in the Unao district.

GRAM.—Of gram the majority of the samples exhibited were not remarkable, being of the common variety, and some of them much mixed with peas and kesari. The samples of the white kind, usually known as "Cabuli," were freer from admixture with foreign grain, but in this class again the commoner description obtained both prizes. This went to Baldeo Buksh, Talukdar of Akori, Unao, and to Syed Meharban Ali of Gulathi, Bulandshahr, though a sample of unusually large grained white gram shown by Thakur Kalandar Singh of Pershadpur, Kheri district, attracted the attention of most visitors, while a species of black gram grown by Rai Madho Singh of Dhallippur, Partabgarh, was also deserving of mention as being of a new and rare description.

PULSES.—Of other pulses the show was large, the samples of urd, arhar, moth, and mung, being most numerous, and amounting to 67, 33, 28 and 27 specimens respectively. The prizes for urd went both to the ordinary kind, though a very pure sample of a black variety shown by Syed Mahomed Khan of Daulatpur, Bulandshahr, deserves special notice. Among the samples of arhar a bag of black and one of white grain were rare, the former of which of a kind called "raimonia" gained 2nd prize. Of moth, mung and masur none of the samples were such as to call for special remark, and those to which the prizes were awarded were little superior to the others. Of peas the samples exhibited were chiefly of the better white description, there being only 8 of the small common country pea. In this class both prizes deservedly went to the former kind. Of *lobia*, the samples exhibited were both few and poor, and hence only one prize was awarded for this pulse. A specimen of a large grained variety, exhibited by Balgobind of Sabsukhpur, Sultanpur, was somewhat rare, but for this very reason failed to gain the prize.

MILLETS.—Of principal millets, juar and bajra, the number of exhibits was numerous, especially those of juar, among which were some very fine samples, the prize ones being specially so. Two of the samples sent as juar were in reality *sorghum saccharatum*, or seed of Chinese sugarcane, which being a plant of but late introduction into these provinces, the difference between it and ordinary juar was probably unknown to the exhibitors. Another new fodder seed was *reana* of which three samples were exhibited, but neither for it nor for *sorghum* were any prizes allotted. Of the smaller millets the samples of *kodon*, *marua* and *kakun* were most numerous, but, except kodon, few were much superior to the descriptions to be met with every day in the bazar. One prize only was allotted to each grain of this class. The only samples deserving of special notice were that of *kodon* which received the prize, and which was unusually fine, and a sample of black *kakun*,

which, though noticeable for its variety, was not considered equal to a white variety which was adjudged first place.

RICE.—Coming next to rice, a glance at the tables would be sufficient to inform any one, ignorant of the principal crops grown in Oudh, that this grain is undoubtedly its chief product, for while of wheat there were but 125 samples, the 450 bags of rice occupied about one-fourth of the whole space devoted to grains. The prizes in this class were allotted as follows: for husked rice 8, *viz.*, 4 for transplanted, and 4 for short, sown broadcast, and two for unhusked rice.

Everyone of the numerous varieties grown in Oudh were represented but it will be sufficient here to mention those specimens, which were awarded prizes. It no doubt struck many visitors, Europeans especially, that the bags labelled with the yellow prize tickets without exception all contained small grained rice and such as a European would never select for choice. It must however be remembered that with regard to this grain, the taste of the native differs diametrically from that of English people, and the consideration in which the different kinds of rice are held varies inversely with their size, no species perhaps surpassing in smallness of grain that called, from the estimation in which it is held, "Badshah pasand," or King's delight. Of the husked rice the other varieties which took prizes were *hansraj*, *matmasi*, *dhola*, and *sutiari*: among unhusked rice the prizes fell to samples of jarhan and gauria, both species of Aghani rice.

OILSEEDS.—Of oilseeds the best represented were sarson, linseed, and til. Of the first there were 55 samples, of which 45 were yellow sarson, and 10 red, all being good specimens, specially the two yellow ones which took the prizes. Among the samples of linseed a black species, exhibited by a native of Gonda, deserves notice as being uncommon, though the prize was awarded to a specimen of the ordinary kind grown by Chandi, Kurmi, of Jahangirabad. Til was represented by 21 samples of the black kind, and 13 of tilli or white til. None of either kind were remarkable, though all were fairly good. The prize for til was awarded to Ghazaffar Hossein, Talukdar of Akbarpur, Fyzabad, and that for *tilli* to Syed Mohamed Khan of Daulatpur, Bulandshahr. Of castor and poppy seed the number of exhibitors was small, and none of the samples were worthy of special remark. The prizes were awarded to Din Dyal, a native of Bahraich, and to Rai Sarabjit Singh of Chamki, Partabgarh, respectively, to the latter of whom also was adjudged the prize for kusum seed.

Of saccharine products the show of *rab* and *gur* was numerous, the former numbering 40, the latter 35, and in both classes were some very superior specimens.

Taking *rab* first. For this three prizes were awarded, but unfortunately not one of the exhibits was accompanied by a specimen of the cane from which it was extracted, nor was it noted whether the Bihia or country mill had been used for pressing the cane, and hence show of these two products lost much of the interest they would otherwise have possessed. All the prizes

were awarded to Oudh exhibitors, but two or three from the North-Western Provinces deserve mention. One shown by Pandit Ajudhia Pershad of Shahjahanpur, a district noted for its sugar, and one by Raja Jagat Singh of Tajpur. These specimens were both of a bright light brown colour, the proportion of crystallizable sugar in each being very large, and the crystals themselves of unusual size. From the latter the syrup appeared to have been partially expressed, and hence, having passed from the stage of *rab* to that known as *putri*, was ineligible for a prize.

Two samples of *rab* extracted from *sorghum* grown at Rawatpur, in the Cawnpore district, deserve notice, as being perhaps one of the first attempts to make sugar from that plant in these provinces.

GUR.—Regarding the absence of specimens of cane, the same remark applied to the *gur* samples as those of *rab*, but in the case of that to which the first prize was awarded, *viz.*, one shown by Maulvi Muzaffar Ali of Enayat Nagar, Sitapur, it was noted that a Bihea mill had been used. Probably also that which was placed 2nd, as it differed but little from No. 1, and these two samples were much cleaner, and of a better colour, than any of the others.

Of sugar, both kacha and pakka chini, there were 21 exhibits. Both prizes were adjudged to specimens of the pakka variety which were remarkable for their fineness, colour and flavour, made respectively by Raja Krishna Datt of Gonda, and Syad Mahomed Khan of Bulandshahr.

TOBACCO.—Of tobacco the samples were all, with one exception, of the common country description. That was a sample of American, grown by Mr. Martin of Sahibganj, Kheri, with fine leaf and of good aroma, and altogether a very successful production. Notwithstanding this it only succeeded in gaining 2nd place, the 1st prize going to a specimen of strong "desi" tobacco. This result due is to the fact that the judges were all native, who look solely to strength, while by Europeans good aroma is the quality most valued in tobacco.

COTTON.—The samples of cotton exhibited consisted chiefly of specimens of foreign varieties, grown at the Saharanpur Botanical Gardens, the Cawnpore Experimental Farm, and at the Awa and Rawatpur estates. Oudh not being a cotton producing province, the samples of country cotton were few, and none of superior quality. The first prize however was awarded to a sample of American cotton grown in Oudh by Kuar Harnam Singh of Bahraich, from seed supplied by the Department of Agriculture and Commerce. This was a specimen with a fine long straight staple, of bright colour and very silky.

The second prize was awarded to a sample of Bahmia cotton grown at Awa. Between this and No. 1 there was little to choose, except in the straightness of staple. Third place was taken by a bag of new Orleans cotton, grown by Raja Jagat Singh of Bijnor, and which, had it been clearer, would in all probability have taken 1st place.

FIBRES.—Of fibres, the samples exhibited for competition were few, and of no particular merit, except one of aloe from Bulandshahr, very clean and strong, of bright white colour.

A specimen of *bhindi* (abelmoschus esculentus) fibre from Rawatpur deserves notice, as being somewhat new in these provinces.

Of the remaining products for which prizes were awarded, *viz.*, indigo, spices, *ghi* and tubers, the show was small, and none of such superior quality as to call for special remark.

J. H. HARRISON,
Asst. Collr., on special duty.

Countersigned
F. N. WRIGHT,
Offg. Dir., Dept. of Agri. and Commerce.

Prize List—Agricultural Products.

Name of Produce.	Grade of Prize.	Amount of Prize.			Name, caste, and residence of exhibitors.
		Rs.	A.	P.	
White wheat ...	1st.	10	0	0	Mahesh Bux, Partabgarh.
Ditto ...	2nd.	8	0	0	Sultan Singh, Talukdar of Akrampore, district Unao.
Ditto ...	3rd.	7	0	0	Babu Ram Sahay, Unao.
Ditto ...	4th.	5	0	0	Surneet Singh, district Cawnpore.
Red wheat ...	1st.	10	0	0	Syed Mohamed Jan, Talukdar, Doulutpore, district Bulandshaher.
Ditto ...	2nd.	8	0	0	Syed Meherban Ally of village Gulaotee, district Bulandshaher.
Ditto ...	3rd.	7	0	0	Mir Ghazzaffir Hossain, Talukdar, Akberpore, district Fyzabad.
Ditto ...	4th.	5	0	0	Narain of village Mudhwa Kalan, district Sultanpore.
Other wheat ...	1st.	6	0	0	Raja Kishun Dutt Ram, Talukdar, Singha Chanda, district Gonda.
Ditto equal	2nd.	5	0	0	Prag Dutt, Seetapore.
Ditto	2nd.	5	0	0	Wazeer Chund, Talukdar, Bara Gaon.
Ditto ...	3rd.	4	0	0	Bukhtawar, Koree of village Bunthra.
Barley ...	1st.	8	0	0	Surneet Singh of Rawatpore Court, district Cawnpore.
Ditto ...	2nd.	7	0	0	Sultan Singh, district Unao.
Gram ...	1st.	8	0	0	Buldeo Bux, Talukdar, Maurawan, village Akohree.
Ditto ...	2nd.	7	0	0	Syed Meharban Ally of Golowtee, district Bulandshaher.
Pea ...	1st.	3	0	0	Shew Pershad, Mohunganj, district Rai Bareli.
Ditto ...	2nd.	2	0	0	Karamat Ali, Shekh, of village Lahsora, district Bara Banki.
Arher ...	1st.	3	0	0	Thakur Buldeo Singh of Kan Mao, district Seetapore.
Ditto ...	2nd.	2	0	0	Raja Roder Partab Sahu of Dera, district Sultanpore.
Lobia ...	1st.	3	0	0	Sobba, Ahir, of Abdulla Nagar, Hardoi.
Oord ...	1st.	3	0	0	Syed Danish Alli of Karim Nagar, district Hurdoi.
Ditto ...	2nd.	2	0	0	Rana Shunker Buksh of Khajoorgaon.
Mung ...	1st.	3	0	0	Naraina Koree, of Hoshyarpore, Perganah Bungar, district Hurdoi.
Ditto ...	2nd.	2	0	0	Syed Meharban Ally of Golawtee. district Bulandshahr.
Moth ...	1st.	3	0	0	Buldeo Bux of Akohre, Perganah Maurawan, district Unao.
Ditto ...	2nd.	2	0	0	Gunga Din, Koormee, of village Raipore, district Bara Bankee.
Masur ...	1st.	3	0	0	Paraunee, Aheer, of village Janaupore, district Fyzabad.
Ditto ...	2nd.	2	0	0	Raja Krishn Dutt of Gonda.
Bajra ...	1st.	8	0	0	Newazish Ally of Goui, district Hurdoi.
Ditto ...	2nd.	7	0	0	Mohkum Singh of Buhlolepore, district Hurdoi.
Small Juar ...	1st.	8	0	0	Baboo Ram Sahay of Hurha, district Unao.
Ditto ...	2nd.	7	0	0	Kashee Singh of Mohunganj, district Roy Bareilly.
Maize ...	1st.	6	0	0	Budree Narain of district Gonda.
Ditto ...	2nd.	5	0	0	Chahun Singh, Amosee, perganah Bijnor, district Lucknow.
Ditto ...	3rd.	4	0	0	Tehsildar of Poorwa, district Unao.
Rice transplanted ...	1st.	10	0	0	Jai Gobind, Brahman of Perganah Tulseepore, district Gonda.
Ditto ...	2nd.	8	0	0	Bishun Dyal of village Dabeepore, district Pertabgarh.
Ditto ...	3rd.	7	0	0	Ranee Pirthee Koor of Mustafabad, perganah Rutya, district Pertabgarh.
Ditto ...	4th.	5	0	0	Jhagroo, Koormee, of village Ugia Prag, perganah Utrola, district Gonda.
Total Rs. ...	...	218	0	0	

Prize List—Agricultural Products.

Name of Produce.	Grade of prize.	Amount of prize.			Name, caste, and residence of exibitors.
		Rs.	A.	P.	
Carried over ...	...	218	0	0	
Rice broad cast ...	1st.	8	0	0	Mussumat Kaneez Zahra of perganah Rudouli, district Bara Bankee.
Ditto ...	2nd.	7	0	0	Arman Koormee, of village Aujolia.
Ditto ...	3rd.	6	0	0	Tehsildar of Poorwah, village Shajhpore, district Unao.
Ditto ...	4th.	4	0	0	Guneshee Chaudree of village Gadhee, district Bahraich.
Dhan ...	1st.	6	0	0	Raja Jagmohun Singh of Chundapore, district Roy Bareilly.
Ditto ...	2nd.	4	0	0	Munshee Fuzl Hosain of Gopamao, district Hardoi.
Ulsee (oil-seed) ...	1st.	8	0	0	Cheedee. Koormee, of Jahangeerabad.
Ditto ...	2nd.	7	0	0	Nawab Baker Ally Khan, district Seetapore.
Black Til ...	1st.	5	0	0	Gaazanffar Hosain, Talukdar Moneerpore, district Fyzabad.
Tillee ...	1st.	5	0	0	Syed Mohamed Jan of Daulutpore, district Bulandshahr.
Posta (poppy) ...	1st.	5	0	0	Ray Sarubjeet Singh of Chumkee, district Pertabgarh.
Castor seed ...	1st.	5	0	0	Din Dyal of Bahraich.
Serson ...	1st.	5	0	0	Baboo Nursingh Narain Singh of Pulyo Gopa, Perganah Haveleo Oudh, district Fyzabad.
Lahee ...	1st.	5	0	0	Jaigobind, village Bhaner, Perganah Tulseepore, district Gonda.
Kusum seed ...	1st.	3	0	0	Ray Sarabjeet Singh of Bhudree, district Pertabgarh.
Murwa ...	1st.	5	0	0	Gainda, Kashee, of village Rewan, district Roy Bareilly.
Kodon ...	1st.	5	0	0	Jagan Nath, Jamadar of village Jora, district Unao.
Sawan ...	1st.	4	0	0	Dildar Hosain Khan Nawamao, perganah Shekhpura, district Bara Banki.
Ditto ...	2nd.	3	0	0	Nunt, Brahman, of Saadut Nagar, district Seetapore.
Kakun ...	1st.	5	0	0	Chunga, Brahman of Sultanpore.
Coriander seed ...	1st.	6	0	0	Baboo Mahesh Bux, Talukdar, Dhanawan, district Pertabgarh.
Ditto ...	2nd.	4	0	0	Baboo Ram Sahay district, Unao.
Huldee (dried) ...	1st.	5	0	0	Baboo Mahesh Singh, Talukdar Dhanawan.
Green Huldee ...	1st.	5	0	0	Modhoo, Kunjra of Jahangeerabad.
Kalaungi ...	1st.	2	0	0	Ramadhin of Amethee, district Sultanpore.
Indigo ...	1st.	12	0	0	Mr. Martin of Phaphond, district Etawah.
Ditto ...	1st.	8	0	0	Newazish Ali Khan, Muhdewa, district Bahraich.
Safflower ...	1st.	5	0	0	Muzaffer Ali of Unao.
Goor ...	1st.	10	0	0	Moulvee Mozaffer Ali of Enayet Nagar, district Seetapore.
Ditto ...	2nd.	8	0	0	Raja Kazim Hosain Khan.
Ditto ...	3rd.	7	0	0	Muhdewa estate, district Fyzabad.
Ghee ...	1st.	8	0	0	Anunt Singh, district Lucknow.
Ditto ...	2nd.	7	0	0	Rustum, Gojar of Otergaon, district Sultanpore.
Sugar ...	1st.	8	0	0	Raja Krishn Dutt, Talukdar, Oel, district Khereo.
(Chenee) ...	1st.	7	0	0	Syed Mohamed Jan of Daulatpore, district Bulandshahr.
Tobacco ...	1st.	8	0	0	Holas Marai of Jalalpore Biswan, sent by Raja Amir Husain Khan of Mahmudabad.
Ditto ...	2nd.	7	0	0	Mr. Martin of Sahibganj.
Potatoes ...	1st.	6	0	0	Syed Abdul Aziz, Manager of Rawatpore, district Cawnpore.
Ditto ...	2nd.	5	0	0	Belohra Estate.
Ditto ...	3rd.	4	0	0	Khamanee, Kachee, Chungeeghar, Cawnpore.
Aloe fiber ...	1st.	5	0	0	Menga son of Buddha Chandpore, Bulandshahr.
Putsun ...	1st.	6	0	0	Juggan Nath Baniya of village Chuka, district Bahraich.
Ditto ...	2nd.	4	0	0	Syed Meharban Ally of Bulandshahr.
Total Rs. ...	...	471	0	0	

Prize List—Agricultural Products.

Name of Produce.	Grade of prize.	Amount of prize.			Name, caste and residence of exibutors.
		Rs.	A.	P.	
Carried over ...	...	471	0	0	
Sanai ...	1st.	6	0	0	Court Mudhpore, Perganah Pattee village Hanomanganj district Pertabgarh.
ditto ...	2nd.	4	0	0	Baboo Mahesh Bux, Talukdar district Pertabgarh.
Rab ...	1st.	10	0	0	Kunhia, village Khana.
ditto ...	2nd.	8	0	0	No name, mauzah Salahpore.
ditto ...	3rd.	7	0	0	Meer Zaffer Mehdee Talukdar of Alinager district Bahraich.
Cotton ...	1st.	10	0	0	Koor Hurnam Singh Ahlwalia district Bahraich.
ditto ...	2nd.	8	0	0	Muna Khan, American Bamiah Awagarh Court.
ditto ...	3rd.	7	0	0	New Arlines, Rajah Jagat Singh.
Ghunya ...	1st.	7	0	0	Shew Bux Cultivator Perganah Laherpore.
Bengali Potatoes ...	1st.	8	0	0	Cawnpore Baboo Tiloki Nath Mukerjee.
Total Rs. ...	...	546	0	0	

In all ninety-two certificates, and Rs. 546 cash, were awarded as prizes for Agricultural products. None of the exhibits were deemed worthy of a Medal.

CHAS. S. NOBLE, MAJOR,
Secretary Talukdars' Agri. Meeting.

LUCKNOW :
21st *March* 1881.

Abstract of Prizes awarded for Agricultural Products.

No.	No. of Certificates.	DISTRICTS.	Amount of Prize. Rs.	A.	P.	REMARKS.
1	2	Lucknow	13	0	0	
2	7	Bara Banki	37	0	0	
3	13	Unao	74	0	0	
4	7	Sitapur	41	0	0	
5	7	Hurdoi	33	0	0	
6	2	Kheri	15	0	0	
7	5	Fyzabad	27	0	0	
8	6	Bahraich	40	0	0	
9	6	Gonda	33	0	0	
10	6	Rae Bareli	30	0	0	
11	5	Sultanpore	21	0	0	
12	8	Partabgurh	49	0	0	
12	74		413	0	0	Total of the prize list Agricultural products. Certificates 93. Cash Prizes Rs. 544.
		To Director of Agriculture & Com.				
1	8	Bulandshaher	48	0	0	
2	5	Cawnpore...	31	0	0	
3	1	Etawa	12	0	0	
4	5	Elsewhere	40	0	0	
4	19	Total	131	0	0	
	93	Grand Total	544	0	0	

LUCKNOW:
19*th March* 1881.

CHARLES S. NOBLE, MAJOR,
Sectry. Tal. Agri. Meeting.

I have the honor to submit a report on the Arts and Manufactures of the Lucknow Exhibition of 1881.

In doing so I have to point out that I laboured under great disadvantages in its preparation. I was not informed until the morning of the day when the Exhibition was opened to the public that I should be called on to review these Departments. Hence I am compelled to inspect the exhibits and make notes while a crowd was surging around me on every side. In the next place, exhibits were not classified or grouped, and I was under the necessity of making a classification in my mind as I went along. This rendered most difficult the task of comparing the exhibits in each class with each other.

In the present review I have grouped the subjects as I classified them with the object of enabling me to rightly adjudge my awards.

DEPARTMENT I.

Agricultural, and Animal and other Products used in Manufactures.

SECTION A—RAW.

I. Fibres.
II. Cotton.
III. Wool.
IV. Silk.
V. Leather.
VI. Dyes.
VII. Tobacco in leaf.
VIII. Oil seeds.
IX. Sugarcane.
X. Honey and wax.
XI. Gum and resins.
XII. Lac.

SECTION B—MANUFACTURED.

I. Tobacco.
II. Sugar.
III. Preserves.
IV. Provisions.
V. Oils.
VI. Chandlery.
VII. Perfumes.

Department I. Agricultural, animal, aud other products used in manufactures.

SECTION A.—RAW.

I. FIBRES.

THERE were only four Oudh Exhibits in this class, Nos. 9, 10, 14, and 212 in the catalogue, these came from the Partabghar, Bahraich, and Unao districts, there were specimens of raw jute thread, twisted jute thread, rough Indian hemp, and elephant grass (háthi chinghár). There was no competition and no award. These exhibits presented no points of marked excellence. There were also three exhibits sent by the Department of Agriculture and Commerce : but they attracted no special notice.

It is to be regretted that there was no competition and no variety of exhibits in this class. There has always been a demand for fibres for the manufacture of twine, ropes, matting, canvas, jute fabrics, and paper, but there is at present a special cause for regard to this class, arising from the establishment of paper mills in Lucknow. The proprietary Company is so alive to its interests that it offered special rewards in this class. It is unfortunate they met with no response. The fibres ordinarily met with, and likely to be availed of, for the above manufactures are munj, san, háthi chingár, káns, bambu, alsi, cocoanut and plantain fibres, and straw. These and any others which may suggest themselves should be made the subject of special prizes in any future exhibition, and the prizes should be awarded with regard to the manufacture for which it is intended that the fibres should be used.

II. COTTON.

The Department of Agriculture and Commerce exhibited New Orleans cotton, ordinary country, Hinganghat, Egyptian cotton, American grown at Rajpur, and also several samples of cleaned cotton and of cotton seed.

Oudh is not a cotton province : but it showed samples from various places :—

Partabghar, Rani Dharmraj Kunwar.
Bahraich, Gurdin Kurmi.
Unao, Tahsildar of Purwa.
Lucknow, Mr. Cornelius, Inspector of Police,
,, (not stated), Kunwr Harnam Singh.

It is to be regretted that sufficient care was not taken to show on each sample what seed it was grown from, and how it was reared, Mr. Cornelius alone called his as "American grown in Lucknow."

There was one sample of *semal* cotton but it calls for no special notice.

III. WOOL.

There were but three specimens of Wool, Nos. 28, 143, and 148 in the catalogue. Of these No. 143 was a good specimen of cleaned wool prepared for the manufacture of felt. Bahraich is the only district which sent an exhibit. There is no reason why the other northern districts of Oudh should not have competed with Bahraich.

IV. SILK.

There was no raw silk exhibited in this Department, but some Cocoons were erroneously submitted in the Agricultural Department among grains and seeds. Sericulture was much favoured in Oudh in former days, and at the present time it is not neglected in parts of the North Western Provinces. There is a steady demand for silk in varions Indian manufactures, and Lucknow draws on Bengal and the countries North and West of the Punjab, and also on Rajputana to a minor extent, for silk for the manufacture of embroidered goods. It would therefore be worth while in a future exhibition to invite competition with a view to introduce better varieties than are at present known.

V. LEATHER.

Although Lucknow is an emporium for hides and skins which are brought from the north and west of Oudh, and which come into the hands of tanners from the many butchers in this large city, and although hides and skins are cured in Lucknow and exported, there was no prize offered and no competition invited under this class. The impetus which has been given to tanning and leather dressing in Upper India by the establishment of a Government Factory at Cawnpore, renders it incumbent on promoters of an exhibition of this class to devise means of stirring native tanners to emulate the superior articles produced under English supervision. At the same time there are also some specialities of native manufacture which can be found to equal English goods of the same class, and these should also be encouraged so as to promote greater excellence. I should suggest for future exhibitions the following classes of prizes to be competed for by *bonafide* native exhibitors :—

1. Buffalo, bullock and cow hides dressed by chammars,
2. Sheepskins (1) *badami* (proprio colore).
3. do. (2) *lal*
   do. (3) *nilak.*
3. Goat skins dyed blue (*nilak*).
4. Patent leather (*lûk*).
5. Shagreen (1) (Kimukht)
   (2) (Karkin).

It might be advisable as a tentative measure to offer a reward for porpoise hides, and for *goh* skins, and for furs and the like, as far as these commodities have become articles of demand from India by Europe.

VI. DYES.

There was but one exhibit under this class, a specimen of indigo sent from Partabgarh District. This is obviously inadequate as a representative of dyes produced within the province of Oudh. Though there has been much attention paid to dye stuffs by the Department of Agriculture and Commerce, there can be little doubt that we have still something to learn regarding the dye stuffs in use in these provinces. The materials used for wools, cotton, and silk differ much, and prizes offered for the best collections of dye stuffs for wools, cotton, and silk, might bring to notice some useful materials not at present familiarly known. Persons who have seen the variety and intensity of colouring imported by Kashmiris to wools for shawl weaving cannot but wish to know more than is matter of common knowledge on this subject.

VIII. TOBACCO LEAF.

This was placed in the section with grains and pulse.

VIII. OIL SEEDS.

These also were placed in the section with grains and pulse.

IX. SUGARCANE.

This was placed in the same section with grain and pulse.

X. HONEY AND WAX.

There were two specimens of honey, one sent by the Rajah of Nanpara, but there was no note attached to the exhibit, and the other from Bhinga. The latter is the kind called by native chukunta, which is collected from trees in the cold weather.

XI. GUMS AND RESINS.

There was but one exhibit under this head, a sample of resin from Hurdutnagar in Bahraich district, but it was impossible to form an opinion of the quality as there was no note showing from what tree it had been collected.

XII. LAC.

The Rajah of Nanpara sent one specimen, and Manpal Singh of Pragpur another : but though these were entered in the catalogue, I could not find them in the exhibition room.

SECTION B.—MANUFACTURED.

I. TOBACCO.

There were no samples of manufactured tobacco exhibited. Within the last two years the manufacture of tobacco after the European and American styles has taken permanent hold in Upper India, and a few prizes in this class would not be mis-spent as an encouragement to a business so important as tobacco manufacture in India is to Europeans.

II. SUGAR.

Manufactured sugar was not exhibited.

III PRESERVES.

Lucknow enjoys a good reputation for the manufacture of jellies, chatnis and fruits preserved in syrup. There was a first grade prize awarded in this class to Ikram Ali and Nabbi Buksh.

A second class under this head is sweetmeats, and confections. There was offered a medal in this class, and the show was good but one sided. For this reason the medal was not awarded. The exhibitors confined themselves to the making up of sugar confections in artistic forms, imitations of fruits and the like. There was no show of ordinary plain and wholesome sweetmeats. The exhibitor who produced the most skilfully made confections was Qazim Ali, and he received a first prize but not the medal.

V. OILS.

There were no exhibits under this head, more attention should be given to oils with a view to raise the standard of manufacture and, it possible, lead to the use of machinery. This is very important in a country like India, which is a staple producer of oil seeds and also an extensive exporter. If the oil were exported in manufactured state, the seeds would be saved to the country as fodder, fuel, manure etc. If these remarks be true they are of more force as regards the north of Oudh than as regards almost any other place, for it is one of those tracts which produce oil seeds most abundantly in Upper India, if indeed, it is not ahead of all.

I might be allowed to suggest that at any future exhibition oils should be classed

(1) Oils made with the *Kolhu*,
(2) Oils made with patent machinery,
(3) Medicinal Oils.

And prizes given to each kind of oil in each class. I believe this would do much to stimulate the native oilman to improvements in production. Kerosine Oil is daily making more head in India, even in native use, to the displacement of the oils which were ordinarily manufactu red to supply a local demand, and this must sell appreciably on the occupation of a large class of the population. Any improvement in the process of manufacture of, say, for example, linseed oil, which would send only the oil to Europe and reserve the seed refuse for India, would be an obvious gain to this country, and prevent a coming depression among oil pressers by opening out to them a new field of employment.

VI. CHANDLERY.

The only exhibits under this head were specimens of toilet soap in bars, and of dhobi's soap sent by by Messrs. Goslett & Co. from Meerut. The soaps were of good quality and apparently pure, but it seems to be difficult in India to impart that fragrance to soap which is inseparable from first quality soap of English mauufacture.

There were no exhibits of candles. This seems strange, for there is a certain demand for country made candles in Lucknow, and they are manufactured in the city. If competition were excited it might give a beneficial impetus to this by no means unimportant business.

VII. PERFUMES.

The competition in this class was confined to Asghar Ali of the Chauk, and Chajju and Ram Narain of Lucknow.

This is as would have been expected by any one acquainted with Lucknow city. These two firms stand out as the representative manufactures of the two kinds of perfumes. Both firms manufacture both kinds, but Asghar Ali bears the palm in the mauufacture of "Masala ka itar" (*i. e.* extract of hina and the like) and Chajju and Ram Narain in "phul ka Itar" (*i. e.* extract of flowers). The names of the perfumes submitted by these firms was legion, and they were 'placed unto the nostrils' of Talukdars, connoisseurs of smells, and their verdict endorsed the popular estimate of the two manufacturers. It is generally thought that the preparation of 'masala ka itar' is more delicate and difficult than that of 'phul ka itar' and for this reason the first prize was awarded to Asghar Ali, and the second to Chajju and Ram Narain.

DEPARTMENT II.

Arts and Manufactures.

SECTION A.—ARTS.

I. Models and Statuary.
II. Free hand Drawing.
III. Engraving.—" *Vide Mr. Constable's Report.*
IV. Photography. *Do.* *do.*
V. Manuscripts. *Do.* *do.*

SECTION B.—MANUFACTURES.

I. Cotton Fabrics.
II. Woollen do.
III. Silk do.
IV. Embroidered do.
V. Dyed do.
VI. Gold and silver lace.
VII. Fibrous manufactures.
VIII. Jewellery and Gold and Silver wares.
IX. Hardware and cutlery.
X. Porcelain and pottery.
XI. Glass.
XII. Furniture and upholstery.
XIII. Ornamental carving and engraving.
XIV. Inlaid work.
XV. Enamelling and plating.
XVI. Leather manufactures.
XVII. Paper.
XVIII. Musical instruments.
XIX. Fancy work.
XX. Native shoes.

SECTION A.—ARTS.

I. MODELS AND STATUARY.

THE art of modelling in clay has been cultivated in Lucknow from time out of mind, and has within the last few years reached a very high degree of excellence. The first encouragement from European judges out of India given to this speciality of Lucknow was in the Paris exhibition, and within the past year a large consignment of clay figures was sent to the Melbourne exhibition. The spirit of competition has been infused into the modellers who practice the plastic art in Lucknow, and the exhibition of 1881 has brought out a class of exhibits far better than anything else hitherto.

The prizes offered for competition were a medal and 25 Rs. to the best collection, and four prizes 5 Rs. each in the second class.

There was no difficulty in making the award of the first prize and medal. Hira Lall and Bhoj Lall of Mashakganj stand out prominently as the best workmen in Lucknow. Their illustrations of Hindu mythological occurrences are marvellously well executed, but the grotesque and fanciful elements which are so largely admitted into compositions of this class obviously tend to diminish the ground afforded for criticism. These brothers have, however, taken up a higher stand and have attempted European models. That they have been most successful is beyond doubt. Their models of the following subjects were the admiration of every visitor and evinced traces of the true artist. They were made at the suggestion of Major Noble, and he is deserving of high commendation for the turn which he has given to the skill of these workers in plastic art.

1. The amorous Cats (two copies from French models (in Terra cotta.)
2. The old shoemaker (from an etching.)
3. The old tailor ditto.
4. Old fluteplayer ditto.
5. Ecstasy and Disgust (two figures from etchings.)
6. Ducks fighting for a frog.
7. Groups of comic figures, frogs, &c.

The second class prizes were awarded to modellers of clay representations of fruit, of wall brackets, and figures generally. Bhowani Dass produced some good figures and brackets. He excelled in the latter. It was he who exhibited at the Paris exhibition, but he has not progressed since then. Girdhari made a good show of models of fruit. His model of a watermelon cut open was especially good. Gopal showed some good figures, particularly an equestrian statuette in clay of the Prince of Wales. Gulab was also awarded a prize for his show of *Sifali*.

II. FREE HAND DRAWING.

The exhibits in this class were few, but it was thought desirable to make awards under the circumstances for the following reasons. It is admitted that the orientals have good colours, delicate manipulation and a keen appreciation of the beautiful when it is placed before them: but the one damning defect of all their art is disregard or ignorance of the rules of prospective. It is only by encouraging native artists to study European models of human figures and European drawings and paintings, that it can ever be hoped to imbue the oriental mind with true art feeling, and to create a knowledge of form and perspective which will render the pictures painted in the East by native artists objects of genuine admiration, rather than a mixed source of wonder and amusement, attraction and disgust, as they are now. There were in the exhibition some exquisitly coloured paintings of Indian scenes by native artists, in which the pretty faces of the female figures and the brilliant colouring were much admired, but the utter inattention to perspective and form, proportion and attitude, nullified all their other excellencies in the eye of the genuine artist. As oriental paintings they were good, but as reproductions of natural objects, pretending to verisimilitude and relief, they were worthless. It is to this defect that regard was had, when it was determined to award the two prizes offered for drawing and painting to two native artists who have left native, to follow European, art. The first prize was awarded to Ganga Sahai, the artist of the 'Oudh Punch' for three pencil drawings, illustrating the modes of irrigation in India. These were original sketches, and highly creditable to the sketcher. The second prize was awarded to one Baboo Mookerjee for his two sketches in pencil, copies of Raphael and Titian. They are well drawn but should be softer in outline. This young artist would do well to avoid attempting to adopt English pictures to Indian ideas, and to pass them as original sketches. His Indianized sketches in pencil of 'The happy family,' and 'The sisters-in-law,' are bad, because they are clumsy adaptations, and because they are ill proportioned and unnatural.

SECTION B.—MANUFACTURED.

I. COTTON FABRICS.

(*a*). Twist and yarns :—no exhibits.

(*b*). Unbleached country cloths, dhoti, garha, &c. :—no exhibits.

(*c*). Piece goods, bleached :—There were exhibited some tolerably good specimens of Lucknow malmal, but there were no samples of the famous fabrics of Jais and Tanda sent in by manufacturers. One or two stray specimens of very fine muslin were to be seen among one of the loan collections, but they seemed as if they had come in accidentally and were not exhibited for their excellence as specimens of the produce of looms. The prize list had classed Lucknow malmal and other fine cotton fabrics with chikkan. This was an error. The weaving and embroidery industries are quite distinct and should be kept apart. The demand for native hand woven malmal

for chikkan embroidery is mainly what keeps up the malmal weavers of Lucknow, and were it not for this demand they would starve. In this sense the two industries are in-ter-dependent, but they should be classed separately.

There was little competition in this class, and a second and third prize only were awarded, the former to Hafiz Rajju, and the latter to Hurgobind and Mohan Lall.

(*d.*) Coloured piece goods :—There were no samples of the products of native looms exhibited, although some excellent textile fabrics are produced in every district for petticoats, female-trouserings, and the like. There was, however, a novelty exhibited by the Department of Agriculture and Commerce, consisting of sample webs of Ludhiana cloth woven at Cawnpore. These were chiefly in two styles (1) check *i. e.* charkhana, and (2) lined patterns *i. e.* patridar. One web in each style was marked for superiority, but the red and white check was superior to the darker lined pattern in closeness of texture, firmness of thread, and at the same time softness and smoothness of finish.

(*e.*) Stamped piece goods, printed calicos :—Lucknow enjoys a high reputation for calico printing, and passes Farukhabad and all other cities in the north west of India in this art. Knowing the brilliancy and variety of colour; and the truly oriental style of the patterns stamped in Lucknow, I expected that the European visitors to the exhibition would be attracted by the fard-razais, palang-poshes (bed coverlets) and chintzes produced, but I was disappointed. The fact is that these stamped goods are prepared throughout the rains for sale in the cold weather, and hence only the remnants of stock, or hurriedly prepared goods, were available for exhibition. The signs of haste were apparent in the deficiency and unevenness of colour of many samples. The three leading Calico printers of the city sent up samples. They were submitted to a very careful classification and examination. The order of merit in the several classes was :—

Fards :	(1)	Ilahi Bakhsh,
	(2)	Munshi Bhagwan,
	(3)	Jagarnath,
Lihafs :	(1)	Jagarnath,
Chintz :	(1)	Munshi Bhagwan.

As Ilahi Bakhsh was the best in colours and stamping, on a complete view of the class he was awarded the first prize and medal. The second prize was given to Munshi Bhagwan.

(*f.*) Tapes and newar, girth web, etc. There were no exhibits in this class.

(*g.*) Ropes. There were no exhibits of cotton ropes, and this seems strange, as it is now near the hot weather and the demand for them is begining. Lucknow exports these both plain and coloured, and both *khalis* and *gilaf*.

II. WOOLLEN FABRICS.

(*a.*) BLANKETS:—There were a few exhibits under this head from Lucknow, but they could not stand beside the very superior blankets sent from Bahraich. Two of these were especially good, and obtained prizes, the first by Kandhai Gadariya of Bhinga, and the second by Samadhan of Sagar. Both these came from the Bahraich District.

(*b.*) FELT :—There were originally no prizes proposed for this head, but the exhibits were so very superior that it was deemed proper to make an award. Bahraich was here again to the front with large sheets of felt exhibited as stamped druggets. Two were especially good, one by Ilahi Bakhsh and the other by Kallu. The former did not equal the latter in accuracy of imprint or brilliance of colour, but was rather superior in the closeness, fineness and pliability of the felt. As this is of more importance than the accessory of colour, the award was made of the first prize to Ilahi Bakhsh and of the second to Kallu. This felt was in all respects, one of the most remarkable exhibits sent up.

(*c.*) SHAWLS:—Though there are many Cashmiri Shawl weavers in Lucknow, and the industry deserves encouragement, no prizes are offered for manufactures of local looms nor indeed for shawls at all. This was an oversight. Among the exhibits in the loan collections, there were some very handsome and perfect shawls exhibited, but it was not stated if they were from Lucknow looms. One shawl exhibited by Shaikh Altaf Hasen, Honorary Magistrate of Cawnpore, was of especially fine and even texture. The pattern was somewhat unusual, but not the worse for that. It was not numbered in the printed catalogue. It does much credit to the taste and judgment of that gentleman.

(*d.*) WOOLLEN CARPETS:—Some good samples were exhibited by the Lucknow Central Jail, and some were shown by City manufacturers, but there were no exhibits of goods manufactured under purely native superintendence good enough to claim an award. The jail carpets were of undoubted excellence.

III. SILK FABRICS.

There were no exhibits of silks from Lucknow City. There were, however, some very handsome Punjab silk fabrics exhibited by Kunwar Harnam Singh, but these were not submitted for an award. The Department of Agriculture and Commerce exhibited some silk fabrics from Azimgurh on behalf of the manufacturers. These fell roughly into two classes, plain and figured. There was a better finish on a plain white silk than on any other shown, and the next place was awarded to a striped silk.

IV. EMBROIDERED GOODS.

This includes chikkan, kamdani, zardozi in large pieces, and also topis of these styles of embroidery.

(*a.*) Chikkan is embroidery with cotton thread on country muslin. The exhibits are numerous, comprising (1) coats, (2) rumals, (3) handkerchiefs,

(4) webs to make doputtas, and (5) *bels*, or strips of embroidery used much as 'insertion' is by English ladies.

The importance of this work to Lucknow is great, as it affords so many poor people the means of supplementing a slender income by domestic industry, and it also is the professional handiwork by which many men, Hindu and Muhamadan, earn a living. The superiority of Lucknow work is acknowledged on all sides. Hence a medal was offered for competition in the general department of chikkan in large pieces as well as to topis, either in chikkan or silk embroidery on silk. This was won by Sheonarain and Sheonath, but there was a close second, Muhamad Niwaz Khan, who exhibited a most beautifully embroidered coat. The *bels* or strips of embroidery to be used as edging and insertion exhibited by Brij Mohan were particularly good.

(*b.*) *Kamdani* is muslin embroidered with gold or silver wire. The exhibits in this class were of specially good quality. The muslin used was good, and the patterns worked both rich and effective, and honestly adhered to in detail. I notice these points with pleasure, because I have found a great tendency shown by manufacturers of Kamdani to pay attention only to the beginning of the piece which is likely to first meet the purchaser's gaze, and to slur over the details of pattern, and, so to speak, thin the embroidery down as they proceed. The exhibits being all good, it was difficult to make an award: but eventually the balance turned in favour of Ilahi Bukhsh. This is, I believe, in accordance with the popular estimate of the various exhibitors. Sheonarain and Sheonath were a close second. They are wise in selecting what is called 'double width muslin' for some of their work, as it is more likely to meet with European customers, than is 'single width.' I mention this, *en passant*, as there has lately sprung up a demand for *kamdani* in England for ball-dresses. The fabric lights up well at night. It is a 'washing material,' a fact which gives it special value.

(*c.*) *Zardozi.* The exhibition was rich in samples of this class. The native gentry of Lucknow and of the province generally, lent some most superbly embroidered coats and vests, saddle cloths, masnad covers, and other specimens of embroidery, with gold and silver thread and salma, sitara, on both velvet and silk. A profusion of these showy goods was to be expected among loan collections sent by native nobility in India: but there is no occasion to dwell on them. The classes whom this exhibition was intended to benefit, are wholesale manufacturers who employ labour and workers, who take orders and execute them at their private houses. Two exhibitors in each class were notably prominent both for artistic workmanship and chastness of design. The two manufacturers were Gopinath and Luchminarain of Patun Gali, and Parshadi Lall of the Chauk. They were so close in competition that it was difficult to give the preference to either. A saddle cloth exhibited by the former turned the scale, and they were awarded the medal, but Parshadi Lall was also placed in the first class and awarded the money prize. The two second class prizes were awarded to Mehdi Hasan and Hingan Khan. The latter showed some well executed embroidered mantel piece and bracket borders.

(*d.*) Topis embroidered in silk or thread on silk or cotton fabrics. There was a medal offered for competition under this head and zardozi topis were excluded as they came under (*c*). The manufacture of topis for export to other parts of India is an important business in Lucknow, and of the two classes, silk and cotton, the latter is by far the more important. The silk topis were few, and all sent by one exhibitor, but they were not as good of their kind as the cotton topis (chikkan embroidery) shown by Muhamad Sher Khan. This workman showed one chikan topi which for skill in needlework and artistic execution was not the least remarkable exhibit in the room. He was awarded the medal.

V. DYED FABRICS.

Although a special prize was offered for competition to the dyers of Lucknow, there were no exhibits under this head. This is much to be regretted (vide ante sub I. A. VI Dyes).

IV. GOLD AND SILVER LACE.

This heading includes gota, kinari, dúb patta, lachka, gokhru, bogali, and many other timmings made up for native dress in India. The manufacture is, like zardozi, one of the staple industries of Lucknow. This city and Delhi, owing to the great demand created formerly by the Courts, became the residences of the most skilled workmen, and though the local cause of their choice of residence no longer exists, these good workman do not migrate. In this class as in *zardozi* there were two manufacturers stood out prominently in the first grade, Kishori Lall who obtained the medal, and Badri Dass who obtained the money prize. In the second class two prizes were awarded, one to Ram Saran and the other to Dabe Dass Patwa. The latter is the chief manufacturer of *hars*, those elaborate necklaces of gold and silver thread and fringe which taluqdars and other native gentry fling round the necks of visitors as a mark of honor.

VII. FIBROUS MANUFACTURES.

There were but two exhibits under this head. This was the cause of some surprise. It would not be difficult to find sub-classes under which exhibits easily obtainable would fall :—

Jute cloth.
Gunnybags.
Tát and salíta.
Munj matting.
Hathi-chingár do.
Cocoanut fibre do.
Reed matting (narkur.)
Palm matting (kajhur).
Sutlí.
Rassí.
Bán.
Dorí

And all these are useful articles of commerce. Much has yet to be made of the fibrous manufactures of India and the mere fact of an increasing export of jute and gunnybags should stimulate us to develope the fibres of this country.

The two exhibits were of *bárik ban* used for charpoy weaving. There were two exhibitors. The specimen sent by Lalla of Lucknow was closer, firmer, and finer than that sent by Balkishn ; but both exhibits were decidedly of most superior quality.

VIII. JEWELLERY AND GOLD AND SILVER WARES.

There was a goodly number of exhibits sent in by the gold and silver smiths of Lucknow, but the show was disappointing. Some of the best known silver smiths of Lucknow exhibited only a few trifles and others did not send in anything. The largest exhibition was Sita Ram's of Golagunj, a manufacturer not widely known to Europeans, but very highly thought of by the native residents of the city. He exhibited a very elegant afternoon tea service and tray in silver, Lucknow pattern ; a couple of goblets in silver with embossed hunting scenes. He also sent in a large tea service in silver with embossed figures of the style termed Burman. It is very unfortunate that gold and silver smiths of Lucknow will not adhere to Lucknow designs, but will try to ape (there is no better word for it) foreign patterns. This Burman work is not equal to the original obtainable from Burma : being grotesque only and not graceful like the originals. It was also a matter of regret to observe that many of the otherwise best articles were marred by a want of due regard for horizontals and perpendiculars. 'A straight eye' is sadly needed by oriental gold and silver smiths.

After Sita Ram came Nund Lall and Sanwal Dass, the former showing a broach and a pair of earrings in gold filagree of most superior finish. Durga Pershad and Kalka Singh fell in the third grade.

Lucknow gold and silver work has become so steady in popular favour, and the demand for it is so likely to grow, that I may be permitted to say in the interests of the workmen of Lucknow, that all work imperfect in execution of details should be rigidly rejected by purchasers. This is the only method of ensuring a high standard of excellence.

This exhibition has brought to the notice of the public several specimens of old gold and silver workmanship held by private individuals, but lent for the occasion. These show that the standard of workmanship was much higher at some bygone date than it now is. The following were specially noteworthy :—

A box and tray in silver filagree with gold lines.
A huqqah and chumbar in silver, the former in filagree.
A box in silver filagree set with precious stones.
Two plates in silver filagree lent by Nawab Ali Khan.
A gold tray, engraved and set with precious stones, diamonds and rubies in the middle, and border of turquoises.

I do not doubt but work equally good if not better in these styles might now be turned out; but there is neither the taste nor the wealth left to command their production for native gentry.

IX.—HARDWARE AND CUTLERY.

The Exhibition was poor in exhibits of local manufactures of this class. The manufacture of iron, brass and copper vessels and utensils and tools, is a very extensive and important business, and some interesting exhibits might have been found. Major Newbery, lit upon some eleven local manufactures of brass padlocks which sound an alarm on being opened. These received an award in the third grade. There were also some well made bits for native country horses. These received a similar reward. Copper manufacturers being a much more important branch of industry in Lucknow, it was determined, to give the first prize for a large *pándán* in a raised and perforated pattern exhibited by Ganga Ram and Narain Dass.

Brass utensils from Benares. The exhibits in this class were numerous and came through the Department of Agriculture and Commerce. They fall naturally into two classes, (1) objects viewed in the flat and (2) objects viewed upright. In the first class a large tray deserves special notice for the perfection of detail in workmanship and for the general effect. Though the engraver has covered the whole tray with subjects taken from Hindu mythology, and given deftly executed details, he has subordinated this to general effect so that the tray is equally pleasing whether viewed as a whole or in detail. In the second class, articles viewed upright or as standing objects, there were in most exhibits serious defects. Due regard was not had by the workmen to the perpendicular and horizontal. The vessels were, so to speak, not built straight. To this must be added that there is great carelessness shown in the finishing the figures on the handles of the lids of urns, vase-covers, and the like. Details the most essential are disregarded. A vase surmounted by a double faced Krishna was free from these defects and was awarded a first prize. The next best piece of workmanship was a vase surmounted by a peacock. Preference would have been given to this had the workman not omitted to finish the tail on the side which is turned in on the peacock's back. It is a mistake to so far disregard truth as to put the eyes in a peacock's tail on the wrong side.

X. PORCELAIN AND POTTERY.

There were no exhibits of pottery proper from Lucknow, or indeed, from Oudh at all.

There was a special class instituted for Lucknow, offering a reward for madariya huqqahs, har-dam-tazas, and the like. The reward was trifling and was awarded to

But any want of modern work was amply compensated by the show of Ghori and Shahjahan China.

Ghori China was originally imported into India by the Ghori kings of Delhi from Ghor, and was believed to possess a quality whereby, if anything

poisonous was placed in it, it would go to pieces. Hence kings used vessels of this China : and huge dishes over two feet in diameter may yet be seen in which pilao was served up in old days to a whole royal house. This China is very rare and has been imitated, but the very pale green colour of unripe fruit and the watery gloss of the real China, is unmistakeable as seen in Malika Jahan's exhibit.

Shahjahan China was made by the workmen whom he employed to make the tiles for the Chini Rauza : and although these workmen taught others and continued to make china, the real porcelain and china made for Shahjahan is hard to procure. All the many specimens shown in loan collections at this exhibition are not Shahjahani ; but for all that they were uniformly good. Nawab Wazir Mirza exhibited genuine Shahjahani bowls and plates, and Shaikh Altaf Husen Khan and Nawab Mehdi Ali Khan, showed China which had been in the possession of Nawab Asufuddaula and one plate bore that monarch's name. There is a point to be remembered by connoisseurs of china in India, that many kings in India generally ordered china and porcelain from China, and that in Lucknow above all places there will be found, for obvious reasons, a strange admixture of the European, Indian and Chinese, in taste and design, in china and porcelain.

The North West Provinces and Punjab sent specialities.

Aligarh sent a small consignment of black earthenware, baked but unglazed. The exhibits were not above the average of the class.

Amroha also contributed pottery. The articles shown were somewhat novel in design and seem to indicate a desire to adopt new forms, but the products are as yet too rough to demand more than passing mention.

Azimgarh showed pottery both black and brown. A prize has been recommended to be given for a surahi in black which has more completeness in finish of pattern than other exhibits of its class. The brown or red pottery is disfigured by clouding in the baking. Strict selection of only the best pieces put into the market, and uniform rejection of all bad workmanship, is the only means of checking the tendency of native workmen to overlook defects of this class. There is, however, a serious difficulty in the way of selection in the case of Azimgarh pottery. The manufacture of this pottery is a monopoly enjoyed by one family in a village in the Azimgarh District. The members of this family will not initiate others into the manufacture, and purchasers must take what they can get.

Multan pottery was exhibited through the Department of Agriculture and Commerce. The number of exhibits was small but attracted much attention. Some pieces were superior, but unfortunately the colours of most were indistinct. The colours were clearest, most defined, and well chosen, in a large flower vase or bowl of goblet shape. The form of the vessel was good. A prize was awarded for this exhibit.

XI. GLASS.

Two prizes were offered in this class, for glass manufactures and for engraving on glass.

Glass is not made in Lucknow, but old glass and fragments of glass, however and wherever procurable, are bought up by glass blowers and moulders who melt them down and make new goods. The most handy glass blower and most skilful glass moulder is Karim Bakhsh. He exhibited some well shaped pickle jars, candleshades, coloured chandelier branches, &c. The first prize was awarded to him.

The prize for engraving on glass was awarded to Saiyad Ali, who submitted a variety of exhibits ; but unfortunatly the very best of all, a pair of large candleshades about 2 feet high each, most beautifully engraved with Persian verses, were hidden from view under an almirah apart from other glass exhibits. They did not escape the eye of the Judge, and won for Saiyad Ali the first prize.

There were some exhibits of glass in the loan collection of Nawab Saiyad Mehdi Ali Khan which deserve notice :—

(1.) A surahi with a very short neck and wide mouth, made of green glass, overlaid with gold.

(2.) A huqqa in the same style.

(3.) Another huqqa in the same style but with a pattern worked in raised and dotted lines on the glass. This has the peculiarity also of inlaying. The glass has been cut into and gold inlaid.

All these were made in Lucknow in the nawabi : but the question remains unsettled whether the glass itself was manufactured in Lucknow or merely moulded or blown here. There are strong averments on both sides. Old residents of Lucknow there are who allege that on the banks of the Gumti beyond the Iron Bridge and opposite the Machchi Bhawan, glass was actually manufactured for the Oudh Court. This may be true : but the past does not so directly concern us as the present. It seems strange that every soda water bottle, every beer bottle, and window glass should have to be imported to India from Europe. The possibility of glass manufacture and the probability of its being renumerative have only to be established, and there is little doubt the capital for its manufacture will be forthcoming.

Glass of European manufacture was exhibited by Messrs. Osler & Co., Calcutta. Their epergnes, mirrors, and glass flowers, quite sustain their reputation as the foremost European glass merchants in India.

XII.—FURNITURE AND UPHOLSTERY.

The exhibition did not succeed in stimulating native manufacturers of household furniture to produce any unusually good work. The exhibits might be reckoned on the fingers of one hand. A ladies' writing table shown by Karim Buksh of Hazratganj was sufficiently good workmanship to demand a second prize and this reward was made.

Sergeant Highway of the D. P. W., supplied a mantel piece of teak and shisham, plain in design but of such delicate polish and accurate joining that it was determined to give him a medal.

XIII.—ORNAMENTAL CARVING AND ENGRAVING.

Bijnor manufacturers brought some well executed goods in carved ebony. The book covers and inkstands were especially good: but these carvers should avoid cutting their names conspicuously in the middle of their carving as it certainly detracts from the value of a rich design in oriental style to discover Ram Baksh or Jiwan Khan or some other name, cut in English letters in the middle of it. The most varied show and the best goods were made by Abdullah, but Murad Baksh was a close second.

Some specimens of Saharanpur carving in white wood were shown through the Department of Agriculture and Commerce. The patterns are English, most of the carvers of this class of goods cut too deeply, *i. e.*, more deeply than is needed, and this is to the detriment of the general effect, their work, a plate in vine leaf pattern, is very free from this defect and might be awarded a prize.

Jalandhar wood work was very sparsely represented and did not attract much notice. The turned and lacquered goods shown by Kunwar Harnam Singh were of a higher class than those shown by the Department of Agriculture and Commerce.

From Amritsar, Bijhan Singh brought carved ivory. His *bahili* and *rath* were especially good, and his carved figures of Hindu gods were perfect. This consignment of ivory goods were quite unexpected and arrived late. It was, however, of much advantage, as it showed the only Lucknow exhibitor, Ilahi Baksh, what trumpery his wares were compared with the superior art of the Punjab.

There was a special class arranged for Lucknow for turners of wood. There was but one competitor, Amir Ali, to whom was awarded a second prize for some charpoy legs.

There were some well finished specimens of carving in ivory in the loan collections. Raja Jagmohan Singh of Bareli District, showed some carved charpoy legs, twisted cord pattern, made on his estate. These and a pair of kharauns, also of ivory, were first-class workmanship, but were cast in the shade by the prettiest possible set of chessmen, which were exhibited by their side.

There was no class constituted for seal engraving, and hence prominence was not given to the seals and amulets of agate and other stones, engraved with arabic, which were exhibited by
who is about the best seal engraver in Lucknow.

XIV. INLAID WORK.

Under this head comes the Lucknow Bidri, Mainpuri inlaying of metal in wood, and the now universally known Muradabad ware.

(*a.*) LUCKNOW BIDRI.* This is a kind of damascening. A vessel is cast and turned, made of an alloy of inferior metals, and a pattern is drawn

* This work originated at the city of Bidar on the Godavery.

on this vessel and carved into it. Into this is laid silver. If the silver be made to lie here with the ground work of base metal, the work is called '*tah nishan*,' and if the silver is raised above the surface of the alloy, it is called '*zar-buland*.' With this premise, it will be understood when it is said that of the exhibitors, Muhamad Beg was a long way best in '*tah-nishan*' and was only equalled in '*zar-buland*' by Sheikh Bhulan. The prize and medal in first grade went to the former, and the latter were awarded a second.

There were perhaps no exhibits in the whole collections shown which equalled in interest two specimens of ancient '*zar-buland*.'

(1) A huqqa with a vintage scene, shown by Nawab Mehdi Ali Khan.

(2) A huqqa with a similar rustic scene shown by Pundit Bishambar Nath.

In the case of these exquisite pieces of art, the figures were all raised in full roundness above the base like a *basso-relievo*. The figures and flowers, trees, &c., so perfectly depicted, must have all been cast and finished before they were laid into the vessel of alloy. This is what constitutes the radical difference between the zarbuland of to-day, and the superior art of the past. The modern workman puts in his silver in an undressed lump and cuts it when it has set. It is earnestly to be hoped that the two noble specimens of high art shown at this exhibition will move the workmen of this city.

The two exhibits referred to are of the French classic style, and, although the present proprietors can give no history of these gems of art, there can be little doubt, that they belong to the period of General Claude Martin.

(*b.*) Mainpuri wood work, inlaid with metal. This work is exceedingly good and deserves encouragement. The trays, boxes, bookstands, and especially the octagonal jewel boxes, were good. Juwahir was the largest exhibitor and undoubtedly the best.

(*c.*) Murádábád inlaid metal goods are so well known that they need not be dwelt on in detail. They are, like Benares work, of two classes, (1) objects viewed in the flat, and (2) upright objects. An award of the first grade was made among the former to a tray in scroll pattern, and in the latter prefereme was given to a surahi. Both exhibits came through the Department of Agricultural and Commerce. After these awards had been made, there seemed on reflection to be a better method of making awards in this class. The Native workmen while admitting the propriety of the two classes adopted, urged that there should be subdivisions according to style. There are three styles of Muradabad work (1) *siyah galam* (2) *tarahdár*, and (3) *gilt sadáh*. The last of these may be discarded as it is plain brass work. *Siyáh galam* is where the whole ornamentation is black lines inlaid with *lac kájal*. *Tarahdár* is where the original brass has been laid bare in places and polished so as to give the effect of gilding. It did certainly operate to the detriment of one exhibitor not to have these sub-divisions, but it caused no injustice as the Murádábád ware was not included in the original scope of the exhibition as a class for prizes. The proper classification can be adopted at any future exhibition.

This Muradabad work is an illustration of the good done to native art by raising the standard of workmanship when European officers of taste and discernment interest themselves in local manufactures. Though many exhibits were not wholly free from defects, the show of this ware were incomparably the best finished modern workmanship shown in any class of the exhibition.

XV. ENAMELLING AND PLATING.

There was but one exhibitor of enamelled goods, and the most of his exhibits were defective in outline, and either too violent or too weak in colour, perhaps both. For this reason the medal was withheld though the first prize was awarded. European influence is much needed in this art.

Plating was misunderstood and confined to silvering of copper and brass goods. The first prize was awarded to Sheikh Husen Bukhsh, but the medal was withheld as the exhibits were few, and the class erroneously limited in competition. Jiwan Bukhsh was second.

XVI.—LEATHER MANUFACTURES.

The medal and prizes offered in this class were intended for competition among the Lucknow manufacturers: but only one maker, Karim Baksh, sent in exhibits, a portmanteau and a set of harness. He was awarded a second class prize as the workmanship was not above the average.

Messrs. Foy & Co., sent from Cawnpore, steel mounted and brass-mounted harness, both black and brown, and also two gentleman's portmanteaux, and one lady's troop ship trunk. This show was so very far superior to anything of the class hitherto exhibited in India, as country manufacture, that it was resolved to give their firm a first class certificate for the manufacture of Leather Goods.

XVII.—PAPER.

There was one exhibit of hand-made country paper sent by one of the few *Kághazis* still left in this city. It was good, but there was no competition and hence no award.

The most serious blow yet struck to the manufacture of hand made paper in this part of India was concomitant with the opening of this exhibition at this time, the Upper India Paper Mills commenced the manufacture of paper by machinery at Lucknow, and turned out specimens which were shown to Government Officers.

XVIII.—MUSICAL INSTRUMENTS.

It seems strange that the exhibits in this class were so few as they were :—

(1.) WIND INSTRUMENTS.—No exhibits.

(2.) STRINGED INSTRUMENTS PLAYED WITH A BOW.—No exhibits.

(3.) DO., PLAYED WITH THE FINGERS.—No exhibits.

(4.) Drums were represented by a pair of dancing woman's drums and a dholuk. An award was made under this head to Karim Bakhsh.

XIX.—FANCY WORK.

(1.) PAPER TOYS.—The prize was awarded to Kishan for a large elephant and howdah with figures in the howdah.

(2.) TALC ORNAMENTS.—There were two prizes in the second grade given to Wali Muhamed and Ahmad Ali : but no first.

(3.) WIRE FLOWERS.—The first prize was awarded to Lutf Ali for a very well made vinery.

(4.) CLOTH FLOWERS.—A prize was awarded to Madar Bukhsh.

(5.) BEAD WORK.—Ilahi Bakhsh obtained a first prize.

(6.) CHURIS OF GLASS COVERED WITH BEADS &c.—The show of these was poor and only a second awarded. The recipient was Karim Baksh.

(7.) BASKETS.—There were two awards made in this sub class. The first prize was conceded to the wife of Shew Narain Lall, of Partabgarh, for some exceedingly will made munj baskets : and the second went to a collection of baskets made by Tháru women, submitted by the Deputy Commissioner of Bahraich.

(8.) PAPIER MACHE.—There was an exceedingly good papier mache tray exhibited from Jaunpur, truly oriental : and a box from Bijnor, but the latter was not equal to the former.

XX. NATIVE SHOES.

A large business is done in the manufacture of shoes at Lucknow and their export. The Committee who arranged this exhibition very properly constituted these native made shoes for native use a separate class, and offered three prizes, but unfortunately the show of exhibits under this class was meagre in the extreme. There was of course a sample of kafsh, and a sample of embroidered ghetla, and of charhanwán, and so on, but nothing like a spirited competition. The awards were made.

1st. Agha Mirza.
2nd. Jafar Husen.
3rd. Ali Bakhsh.

Ali Bahsh is almost the only well-known maker of *kafsh*, and Agha Mirza is great in embroidered shoes (*ghetla* and árámpái). It is impossible to compare these classes of shoes with one another, and therefore there should be sub classes in the class of shoes at a future exhibition. The award has on this occasion been made purely on the outward merits of the various shoes for show as compared with each other. As to durability of workmanship and quality of leather used, there was nothing to pick or choose between any two of the lot.

CONCLUSION.

In conclusion I may be permitted to say that the chief gain of this exhibition has been a preparation of the public mind for another at a not very far off date. There was an exhibition in 1864, and the interval from that date to this was too long. An annual exhibition would probably prove a mistake: but many years should not clapse until another takes place. Probably 1884, just twenty years after the first Lucknow Exhibition, would be a good date to fix. This exhibition would still be in mind, and progress if there be any, would be marked by native visitors.

There is one point as to arrangement which must be made subject of remark. There was no grouping of classes. Circumstances probably prevented this : but in any future exhibition a proper classification should be adopted, and all objects of each class should be brought together and the classes should exclude one another. *e. g.* All articles of jewellery should be shown in one group, both those submitted in competition, and those lent for illustration: not, as was the case in this exhibition, jewellery spread over five cases in different parts of the room. The result was that a distinguished visitor who had seen certain bracelets going into the exhibition, failed to find them among the exhibits until the judges looking for ivory carving, found them carefully laid in a case in which there were no other exhibits of jewellery. Again, classes must exclude classes, *e. g.* in this exhibition, Lucknow-woven muslin and Lucknow chikkan work were seen together for a medal and prizes. The two are quite distinct. Muslin is woven in Lucknow, and part of that produce of local looms is used for chikkan embroidery, but here the connection ends. A prize and medal should be given for each, but not for both in one class.

The exhibits should all be in their places, classed, grouped, and judged before any visitor is admitted to the exhibition rooms. It is indispensable that a judge should see all exhibits in each class together, and not have to hunt them up : and see them, too, at leisure, free from the crush of a gaping crowd and the perturbation of personal discomfort.

W. HOEY, C. S.

OUDH.

List of Prizes awarded in the Department of Arts and Industries.
1881.

Ornaments and Vessels in Gold and Silver.

1st.	Sita Ram	medal & Rs. 20
2nd.	Nand Lall...	,, 15
	Sanwal Dass	,, 15
3rd.	Durga Pershad	,, 10
	Kalka Singh	,, 10

Chikan, Malmal, etc.

1st.	Sheonarain and Sheonath ...	medal & Rs. 15
2nd.	Mohamad Niwaz Khan	Rs. 10
	Hafiz Najju	,, 10
3rd.	Hargobind and Mohan Lall	,, 7
	Brij Mohan	,, 7

Gota Kinari, Silver and Gold Lace, Tapes, etc.

1st.	Kishori Lall	(the medal.)
	Badri Dass ... ... (the money)	Rs. 15
2nd.	Debi Din Patwa	,, 7
	Ram Saran	,, 7

Art Pottery, Modelling in Clay.

1st.	Hira Lall	(the medal.)
	Bhoj Lall ... ... (the money)	Rs. 10
2nd.	Bhawani Dass	,, 5
	Girdhari	,, 5
	Gopal	,, 5
	Gulab	,, 5

Daris, Qalins, etc.

1st.	None (show not large enough.)	
2nd.	Abdul Ghafur for Hazari	Rs. 6

Leather Goods, Harness, Portmanteaux, etc.

1st.	Messrs. Foy Brothers, Cawnpore	certificate.
2nd.	Karim Baksh, Lucknow	Rs. 4

Sweetmeats.

1st.	None, (show not large enough.)	
2nd.	Qasim Ali	Rs. 10

Furniture (Household.)

1st.	None, (show not large enough) for native manufacturer, but a medal should be given to Sergeant Highway for mantelpiece made of teak and shisham.	
2nd.	Karim Baksh	Rs. 10

Turnery, Wood-turned and Lacquered.

1st. None, show poor.
2nd. Amir Ali ... ... Rs. 4

Glass Engraving.

1st. Saiyad Ali, (very good) ... ... Rs. 10
2nd. None.

Pictures, free-hand drawings, Paintings, Illumination, etc., *but not Photography.*

1st. Gunga Sahai, (Oudh Punch) money Rs. 10 and the medal
2nd. P. C. Mukerji ... ... ,, 5

Photography.

1st. Abbas Ali, a medal, a certificate also to Mr. Sache.

Blankets.

1st. Kandhai Garariya of Bhinga, in Bahraich... ... Rs. 5
2nd. Samadhan of Sagar, in Bahraich ... ... ,, 4

Felt.

1st. Ilahi Baksh of Bahraich ... ... Rs. 5
2nd. Kallu of Bahraich ... ... ,, 4

Glass blowing and drawing.

1st. Karim Baksh ... ... Rs. 5

Kamdani, *i. e.*, embroidery with Gold and Silver wire on muslin.

1st. Ilahi Buksh ... ... Rs. 20 and medal.
2nd. Sheonarain, Sheonath ... ... ,, 15

Fireworks.

1st. Farzand Ali ... ... medal and Rs. 20
2nd. Ilahi Baksh ... ... ,, 15

Salma-Sitara, Zardozi, embroidery on velvet and silk with Gold and Silver-thread, etc.

1st. { Gopinath, Lachminarain ... ... medal.
Parshadi Lall ... ... (money) Rs. 15
2nd. { Hingan Khan ... ... ,, 10
Mehdi Husain ... ... ,, 9

Stone-cutting.

No exhibits.

Paper Toys.

1st. Bishan ... ... Rs. 5 and medal.
2nd. None.

Talc Ornaments.

1st. None.
2nd. { Wali Mohamed ... ... Rs. 2
Ahmad Ali ... ... ,, 2

Embroidered Shoes in oriental styles.

1st.	Aga Mirza	Rs. 10
2nd.	Jafar Husain	,, 8
3rd.	Ali Baksh	,, 6

Churis (of Glass, ornamented with beads, etc.)

1st.	None.	
2nd.	Karim Baksh	Rs. 3

Topis, embroidered with Silk or Thread on either Cotton or Silk (Zardozi excluded.)

1st.	Mohamad Sher Khan	Rs. 10 and medal.
2nd.	Raja Ram	,, 7
	Murli	,, 7

Metal Vessels.

1st.	Gunga Ram and Narain Dass	Rs. 10 and medal.
2nd.	None.	
3rd.	Jiwan Baksh	,, 5
	Laltu	,, 5

Fard Razai, Lihaf, etc., stamped by the Calico Printers of Lucknow.

1st.	Ilahi Baksh	Rs. 10 and medal.
2nd.	Munshi Bhagwan	,, 7

Bidar and Zarbuland.

1st.	Mohamed Beg	Rs. 10 and medal.
2nd.	Sheikh Bhulan	,, 7

Ban Munj.

1st.	Lalla	Rs. 3
2nd.	Balkishen	,, 2

Zangar (a lotah of Copper).

1st.	Muzafar Husen	,, 3

Dor (Kite thread).

1st.	Ahmad Ali	Rs. 4 and medal.
2nd.	Mulchand	,, 2

Itar.

1st.	Asghar Ali	,, 7 and medal.
2nd	Chajju, Ram Narain	,, 5

Minakar (Enamelling)

1st.	Bajnath and Sanwal Dass.	Rs. 10 no medal
2nd.	None	

Baskets, made of munj.

1st.	Partabghar (wife of Sheo Narain Lall)	Rs. 3
2nd.	Bahraich (Tharu women)	,, 2

Baskets, made of Arhar, &c.

No exhibits.

MULANNA.

1st.	Sheikh Husen Ali	(money Rs. 10 but not medal)
2nd.	Jiwan Buksh	Rs. 7

WAX FLOWERS &c.

1st. Lutf Ali	Rs. 2
Papier mache from Bijnor prize for box through Director Agriculture and Commerce	Rs. 5
Papier mache from Jounpur for a tray through Director Agriculture and Commerce	Rs. 5
Brass work from Benares, certificate and cash ... for a vase surmounted by a double krishna through Director Agriculture and Commerce.	,, 5

In all 19 medals were distributed to Lucknow exhibitors, and 3 medals to exhibitors from the North Western Provinces.

Rs. 513 in money was awarded in prizes to exhibitors of the city of Lucknow, Rs. 3 to an exhibitor from Pertabgarh, Rs. 2 to exhibitors from Gonda, and Rs. 18 to exhibitors of Bahraich felt and blanketing, Rs. 66 to exhibitors from the North Western Provinces.

To every prize winner, in addition to his medal or money prize, is given a certificate signed by the Secretary to the Agricultural Meeting. In all eighty seven certificates.

CHARLES S. NOBLE,

Secretary, Talukdars' Agricultural Meeting.

LUCKNOW:
21*st March* 1881.

APPENDIX F.

1. List of Talukdars, Raies, Zamindars, and European Officials or Non-officials, who attended the Meetings.

2. Speech of the Maharaja of Balrampur on opening the Exhibition on 8th March 1881.

3. Address of Maharaja Sir Digbijai Singh Bahadur, K.C.S.I. to His Honor the Lieutenant-Governor in public darbar in the Canning College large hall on 10th March 1881.

4. Reply of His Honor Sir George Couper Bart, C. B., K. C. S. I., C. I. E., Lieutenant Governor of the N.-W. Provinces, and Chief Commissioner of Oudh, to the Maharaja's address.

5. Letters received from various Talukdars giving certain sums of money for next years' meeting, and asking for a supply of implements, or for aid in the institution on their estates of "Model Farms." Also advertisement of Talukdar of Bhinga offering a reward for farming treatise, together with other miscellaneous papers.

List of Talukdars (Members of British India Association) who attended the Committee Meetings, or the Exhibition.

Maharaja Sir Digbejey Singh Bahadur K. C. S. I.,	of Bulrampur	in the	Gonda	Dist
Lal Pertab Narain	of Mahdona	„	Fyzabad	„
Raja Tiluk Singh	of Katiari	„	Hurdoe	„
„ Rurderpertab Sah	of Dehra	„	Sultanpur	„
„ Madho Singh	of Amathee	„	do.	„
„ Mohamed Ali Khan	of Hassanpur	„	do.	„
„ Surpal Singh	of Tiloi	„	Rae Bareli	„
Rana Shunker Buksh Singh Bahadur	of Khagurgaon	„	do.	
Raja Tasaduk Roosul	of Jehangeerabad	„	Bara Banki	„
„ Jung Bahadur Khan	of Nanpara	„	Bahraich	„
„ Randheer Singh	of Bharawn	„	Hardoi	„
„ Kazim Hossain Khan	of Bilarah	„	Sitapur	„
„ Bissessur Buksh	of Koomrawn	„	Rae Bareli	„
„ Sitla Buksh Singh	of Gangole	„	Bahraich	„
„ Mahendro Bahadur Singh	of Piagpur	„	do.	„
„ Jagmohan Singh	of Chandapur	„	Rae Bareli	„
„ Kissendat Ram	of Singhachanda	„	Gonda	„
„ Chutterpal Singh	of Chetpalgarh	„	Pertabgarh	„
„ Moonessur Buksh	of Mullanpur	„	Kheri	„
„ Chandur Sakhud	of Sesendee	„	Lucknow	„
„ Surubjeet Singh	of Ramnugger	„	Bara Banki	„
„ Shamsheir Bahadur	of Sadutnaggur	„	Sitapur	„
Bhya Rujpal Singh	of Kamiar	„	Gonda	„
Raja Ajeet Singh	of Turwal	„	Pertabgarh	„
„ Sookmangal Singh	of Shawar	„	Rae Bareli	„
„ Babu Ramsoy	of Banthur	„	Unao	„
Koowar Harnam Singh	of Boundi	„	Bahraich	„
Ram Rakha Mull	of do.	„	do.	„
Sirdar Narain Singh	of Bailabhalla	„	Rae Bareli	„
„ Autar Singh	of do.	„	do.	
Roy Madho Singh	of Daelepur	„	Pertabgarh	„
Mahant Hurchurn Dass	of Maswasee	„	Unao	„
Pertab Ruder Singh	of Rampur	„	Sitapur	„
Dewan Run Bejai Bahadur	of Palli Saefabad	„	Pertabgarh	„
Meer Gazuffar Hoossain	of Peerpur	„	Fyzabad	„
Son of Nonahal Singh	of Bangarmow	„	Unao	„
Choudhry Mohamed Khuslut Hossain	of Kakrabi	„	Hardoe	„
Thakur Bharut Singh	of Etwa	„	Hardoe	„
Newajis Ali Khan	of Alliabad	„	Bahraich	„
Bissen Nath Buksh	of Hasnapur	„	Rae Bareli	„
Babu Surubjit Singh	of Tekani	„	Rae Bareli	„
Buldeo Buksh Singh	of Parsanie	„	Unao	„
Mohamed Ali Beg	of Aurangabad	„	Sitapur	„
Raja Karim Hossain Khan	of Bhatooamow	„	Bara Banki	„
Roy Maharaj Balee	of Rampur	„	do.	„
Moonshi Fazal Hossain	of Jalallpur	„	Hardoe	„
Rughbeer Singh	of Jhanawa	„	Gonda	„
Mirtunjoy Buksh Singh	of Shapur	„	do.	„
Talukdar of Orea Deh	of Oreadeh	„		„
Set Rughbur Dyal	of Maegoondeenpur		Sitapur	

Nawab Ali Khan	of Moylaroygunj	in the	Barabanki	District.
Bulbhudder Singh	of Gauria	„	Unao	„
Choudhry Fateh Bahadur Singh	of Sarosee	„	do.	„
Jagutnath Buksh Singh	of Rampur	„	Sitâpur	„
Babu Azim Ali Khan	of Deogaon	„	Sultanpur	„
Mahesh Buksh	of Danawah	„	Pertabgurh	„
Asad Ali Khan	of Pehramow	„	Rai Bareilly	„
Mirza Faiz Beg	of Baragaon	„	Sitapur	„
Sirdar Ali	of Sesaisalone	„	Bahraich	„
Shaik Inayat-ullah	of Saidanpur	„	Barabanki	„
„ Emam-ullah	Do.		do.	
Koowar Girdhara Singh	of Gokulpursain	„	do.	„
Daya Shunker Bajpae	of Kurdah	„	Unao	„
Fateh Mahomed	of Tiprah	„	Bahraich	„
Furzand Ali Khan				
Bukshee Hurpershad	of Liloulee	„	Bara Banki	„
Wasee-uj-jama	of Meagunj	„	Unao	„
Ahmed Khan	of Raghupur	„	Rae Bareli	„
Mehpal Singh	of Maluna	„	Unao	„

List of those who are not members of the British India Association who attended.

Dost Mahomed of Pariwama.
Shambhoo Dut Singh
Tirbooban Dut
General Lala Sankur Lall
Thakur Soorut Singh
Choudhry Nossrut Ali, Assistant Secretary B. I. A. and Talukdars' Agricultural Meeting.
Shaban Ali Khan
Karinda of Simarpaha estate
Kazir Mahomed Khan, Extra Assistant Commissioner
Syad Mahomed Sahib Tehseldar of Sandeela
Pirbhoo Dyal Sahib Tehseldar of Bahraich
Shakh Baha-ooddeen Sabib Tehseldar
Mahomed Hossain, Dy. Inspector of Schools, Partabgarh
} *Government Servants.*

Other Gentlemen who attended.

Kazi Hashim Ali Khan Vakeel of Rae Bareli
Syud Mohsin Ali Khan
Raja Juggut Singh of Bijnor.
Altaf Hossain Khan
Fidda Hossain, Vakeel of Rae Bareli
Koorban Ali, Vakeel
Syud Shamsooddeen
Pundit Kissen Narain
„ Ajodhea Nath, Ilaquadar, Zila Shâhjahânpur.
„ Raj Narain
Moonshee Kalee Pershad
„ Newul Kishore
Moonshee Mahomed Eakoob
Akbal Kissen
Doogur Singh
Pundit Amar Nath

Moonshee Moostak Ali
„ Abbool Qasim
„ Azeezooddeen
Syud Wazeer Ali
Sayud Hossain

European Gentlemen present.

Colonel MacAndrew, Commissioner of Sitapur Division.
H. J. Sparks Esq. C. S. „ of Lucknow „
W. Lane Esq. C. S. „ of Rae Bareli „
J. S. Anderson Esq. Deputy Commissioner of Sitapur District.
A. H. Harington Esq. C. S. „ „ of Rae Bareli „
Major Forbes, „ „ of Bara Banki „
Major Currie „ „ of Lucknow „
H. S. Boys Esq. C. S. „ „ of Gonda „
J. Dyson Esq. „ „ of Unao „
Major Erskine, Secretary to Govt. N.-W. P. and Oudh (in Oudh Revenue Department.)
Major Low, Deputy Commissioner of Pertabgarh.
F. N. Wright Esq. C. S. Director Agriculture and Commerce.
J. B. Fuller Esq. C. S. Assistant Director Agriculture and Commerce.
J. H. Harison Esq. C. S. Assistant Collector.
J. Quinn Esq. C. S. Deputy Commissioner of Hardoi.
J. Woodburn Esq. C. S. Deputy Commissioner of Fyzabad.
C. Ponsonby Esq. C. S. Deputy Conservator of Forests.
W. Hope Esq. C. E. of Dehra Dhun.
W. B. Thompson Esq. Editor of the Express.
W. C. Benett Esq. C. S. Assistant Commissioner.
Captain F. Barrow Assistant Commissioner.
F. Gibbon Esq. C. S. Assistant Commissioner.
J. Bateman Esq. C. S. Assistant Commissioner.
F. Wells Esq. C. S. Assistant Commissioner.
Captain Grigg, Assistant Commissioner.
J. Hooper Esq. C. S. Assistant Commissioner.
J. Redfern Esq. C. S. Assistant Commissioner.
C. Chapman Esq. Assistant Commissioner.
Colonel Boyce Combe, Assistant Quarter Master General.
Major Noble, Assistant Commissioner.

SPEECH OF THE MAHARAJA SIR DIGBIJAI SINGH, K.C.S.I., ON OPENING THE EXHIBITION ON 8TH MARCH 1881.

"TALUQDARS AND GENTLEMEN,—I can hardly express the pleasure I feel in declaring this Exhibition open. I have been selected for this privilege on account of my position as President of the Taluqdars' Association, which position I hold by the favour of my brother taluqdars. That our efforts in getting up this Exhibition have proved successful is due in no little degree to the support of His Honor the Lieutenant-Governor, who has taken the warmest interest in the present movement, and to whom the people of Oudh are deeply indebted for so many privileges. To Major C. S. Noble also our best thanks are due for his hearty coöperation and willing help. He has been the chief worker in the task of organizing the Exhibition, and the taluqdars have generously come forward to assist him in so far as it lay in their power. We have endeavoured to place before you samples of the products and manufactures of Oudh, and we trust that we have been able to give you a fair idea of these. Our object is a twofold one. We are anxious to please you, and we are anxious—more anxious, if you will allow me to say so—to promote a kindly desire for improvement among our cultivators and manufacturers. I trust that we have so far given you satisfaction. May God grant that our efforts to foster a spirit of enlightened progress may not be altogether without success."

SPEECH OF THE MAHARAJA OF BULRAMPORE AT THE DARBAR ON 10TH MARCH 1881.

"SIR GEORGE COUPER,—You have honored our meeting on this occasion for the purpose of distributing prizes that have been awarded by the Committee for Cattle, Machinery, and Agricultural Products brought in for exhibition from all parts of Oudh, and amongst those prizes are eight silver medals which you yourself have generously given. Though we all know and feel how capable of improvement our method of land cultivation is, yet specimens of products that have been exhibited during the last three days will have, I am sure, convinced all who know anything about farming, that we are not altogether unsuccessful in our efforts to secure the wealth which Mother Earth so bountifully provides for those who treat her properly. The cattle and grain exhibits are, of course, picked specimens and do not represent the average run of such articles; but as regards grain, Oudh will, I feel sure, turn out as good average produce as any other part of India. The condition of our cattle is becoming every day more and more deplorable, and how to ameliorate it has been the subject of anxious discussion at this meeting. Our deliberations on this matter have, I am proud to say, already borne fruit and resulted in judicious measures being adopted for attaining the object we have in view. I allude to the guarantee that certain of us have given that money and prizes shall be annually given for the best specimens of Oudh cattle exhibited at various of our local *melas*. The institution of numerous cattle shows, such as is now contemplated will make our tenantry more careful in

the selection of their breeding stock, and more liberal in the matter of feeding their animals. We have had the opportunity of seeing and hearing and reading much that is new at this meeting, and have to thank Mr. Wright, Director of Agriculture and Commerce, for the exertions he has made to make plain to us so much that is profitable for us to know. We have been favored by the attendance of many friends and gentlemen interested in agriculture, and some of them have been kind enough to bring improved implements of their own invention, the value of which has been occularly demonstrated to us. I have the comfort of feeling that our friendly gathering together has not been altogether unprofitable, and I am encouraged to think that each succeeding year will see our Oudh Agricultural Meeting increase in usefulness and popularity. We all believe that you, who originated the idea of getting up this meeting, will be interested in hearing of its success, and will give us all the support and encouragement that is in your power. In conclusion, I have to offer in the name of the Committee cordial thanks to the Deputy Commissioners of Oudh, and to the Director of Agriculture and Commerce for sending specimens of cattle, agricultural produce and manufactures to our Exhibition. I also especially desire to express our gratitude to Prince Suleman Kadr Bahadur, to Nawab Mehdi Ali Khan Bahadur, to Mirza Agha Ali Khan Bahadur, to Sheik Altaf Hossein, Honorary Magistrate, and to many other Princes and Nobles who, by loans of valuables, and by great personal exertion, have helped us to make the exhibition of trades and manufactures worth looking at. I particularly desire to express our hearty thanks to Raja Jaggat Singh of Bijnor, and to Pundit Adjoodhia Pershad, Illakadar of Andalpur, who have honored the meeting with their presence, and have given us the advantage of their great experience in agricultural reform. To Mr. Constable, we owe hearty thanks for the very interesting history and specimens of early printing in Oudh, so admirably arranged by him. Our Assistant Secretary, Chowdri Nasrat Ali, a member of one of our honored taluqdari families, has been indefatigable in working to assure the success of the meeting, and I ask you to do him the honor of presenting him with a "Khilat" that the Committee have provided in recognition of his services. We all desire to acknowledge our earnest gratitude to you, Sir George, for originating the idea of an Oudh Agriculture Association, and for graciously presiding at this meeting, at a time when domestic sorrow, to our deep regret, weighs heavily upon you. I tender the Committee's heartfelt thanks to Mr. Fuller, C. S., for the readiness with which he rendered his valuable assistance to the Sub-Committee appointed to award prizes to the Cattle Exhibits; to Mr. Harrison, C. S., for the trouble he took in helping to appraise the Grain and Agricultural Products, and to Mr. Hoey, C. S., for his able assistance in dealing with the very interesting collection of Lucknow Manufactures and Fine Arts."

SIR GEORGE COUPER'S SPEECH AT THE DARBAR ON 10TH MARCH 1881.

Maharaja Sir Digbijai Singh and Taluqdars of Oudh,—It gives me the greatest satisfaction to see so many of you gathered together on this occasion to discuss and take into consideration schemes which are likely to conduce

to the improvement of agriculture, and to the prosperity of the agricultural community at large. There can be no doubt that in furthering such schemes you are consulting the best interests not only of yourselves, but also of your numerous sub-proprietors and tenants. Many of you have ample capital, the investment of which could not be more profitably or legitimately made than in introducing such agricultural improvements as will tend to a more thorough development of the resources of your estates. You may rest well assured that all efforts you, either individually or collectively, make in this direction, will be watched by Government with the most active sympathy and approval. I have recently received a letter from the Supreme Government, in which great satisfaction is expressed in the knowledge that earnest efforts are being made by you to promote agricultural progress in Oudh, and it will give me pleasure to report to that Government all that has been discussed and done at this your first meeting.

I am one of those who cling to the belief that by a friendly annual gathering together of taluqdars and zamindars from all parts of Oudh, and by hearing the opinions and experience of each, as also by seeing new implements or machinery, and hearing how these may give improved agricultural products, a vast deal of good may be effected. Every one knows that the natives of Hindustan by the experience of many centuries have, however rude their appliances may appear, learned a method of farming that suits their crops, climate, and soil; but it is possible by studying methods, which have been found to succeed in other parts of the world, and by experimenting with improved seed grains, and with better implements, to learn much that will be useful and profitable. I am sure you all feel grateful to the enterprising gentlemen who have taken the trouble to bring from distant parts ploughs and other improved agricultural implements to Lucknow, and you must have watched these at work during the last three days with lively interest. It is to be hoped that some of these exibits have merited your cordial approval, and may on trial be found useful and suitable for the better cultivation of our Oudh fields.

Perhaps the most important subject you have discussed at this meeting is the possible improvement of agricultural cattle, and you have had opportunity of seeing collected here specimens of the various breeds known in Oudh. There can be no question that a wide field for improvement lies before you here, and it is highly satisfactory to learn that you have already adopted measures which appear wise and powerful for attaining the object in view. Unfortunately the Government cattle farms are unequal to meet a large call for stock bulls, but when it is seen that you really require and appreciate such animals, I doubt not that every effort will be made to satisfy your wants. I look, however, more hopefully to improvement by a judicious selection and proper feeding of the indigenous cattle of Oudh, than by importation of foreign unacclimatized animals. Holding these views, I heartily approve your proposal to establish, in conjunction with existing time-honored Hindu melas in Oudh, cattle shows at which prizes will be given for the best specimens of locally-bred or imported cattle; such a measure as this will doubtless by

degrees bring the breeding and owning of useful good cattle into fashion, and make people ashamed to keep their animals on starvation rations, as is now too often the case.

To show how cordially the Government sympathise with you in this matter, and how ready it is to actively coöperate, it gives me much pleasure to guarantee that at each and every such cattle show, where not less than Rs. 300 has been privately subscribed as prizes, the Government will give a money grant in aid of Rs. 100.

Time will not allow me to say more, and in conclusion I will only add that it is satisfactory to see the Oudh Agricultural Meeting now fairly launched, and that I shall watch its future progress with deep interest. At one time the prospect of drought and consequent agricultural distress made it extremely doubtful whether this year's meeting could be held at all, and the necessarily late decision that it should be held has in a great measure made the show of agricultural products and trade manufactures less perfect than it otherwise would have been. I think, however, you will all agree with me that it was better to hold the meeting now, in face of the many difficulties that came in our way, than to abandon it a second time for another year.

Before sitting down, however, I beg to tender, in the name of Government, and of the public, hearty thanks to those Princes and Gentlemen, named by Maharaja Sir Digbijai Singh, who have generously lent articles of beauty, curiosity, and value, illustrative of the maufactures of Lucknow and other places in India, to the Exhibition, thereby enabling the world at large, rich and poor, to see and admire things that, but for this display of generosity, would have remained unknown to them.

It also gives me pleasure to present the Khilat that you have provided to the Assistant Secretary, Chowdri Nasrat Ali, in acknowledgment of his useful services in promoting the interests of this meeting.

I also express my hearty acknowledgments to Major Noble, to whose unwearied exertions the success of this our first Agricultural Meeting is mainly due.

MR. A. CONSTABLE THEN READ THE FOLLOWING ADDRESS.

SIR GEORGE COUPER; Maharajah of Bulrampur, and Talukdars of Oudh :—

At the special request of the Secretary of the Oudh Talukdars Agricultural Meeting, I took charge of the Catalogue, the Book, Map, Oriental MSS. Sections, of the specimens of lithography from the Newul Kishore Press, Lucknow; and later on, of an exhibition of Photographs by a local artist, Daroga Abbas Ali, all forming part of the above Exhibition, and on view in the Kaisar Bagh Baradari, Lucknow, from the 8th to 10th March.

The Catalogue was ready in time, thanks to the kind permission accorded by Colonel Jenkins, the Agent of the O. & R. Railway, whereby five of the best Compositors from the Railway Press here, were temporarily drafted to the "London Press," to supplement its regular staff. Mr. Richard Craven the Manager of this Press, placed all the resources of his complete and admirable Establishment at my disposal, and he and his Assistants, both European and Native, exerted themselves to the utmost, to secure the punctual issue of the Catalogue, the MS. of which was not *begun*, until Thursday evening, 3rd March, but by dint of great exertion on the part of the "London Press," the complete English Edition, of 300 copies, was ready by 1 P. M. on the 8th instant, and I was able to hand one special copy to the Maharaja of Bulrampur and Tulsipur, Sir Drigbijae Singh Bahadur, K. C. S. I., President of the British India Association, who formally opened the Exhibition; and another to His Honor Sir George E. W. Couper, Bart. C. B., K. C. S. I. and C. I. E. Lieutenant-Governor of the North-Western Provinces and Chief Commissioner of Oudh, and Counsellor of the Empress, who afterwards visited it. These special copies having been presented, the remainder of the issue, of both the English and Urdu editions, was made available for the general public.

I was requested to bring to the notice of the Secretary, those Exhibitors, in the Sections of which I had charge, who I considered deserving of reward; this pleasing duty was duly performed, and my awards having been formally confirmed, I now have much pleasure in announcing the results.

The collection of Photographic views of Indian Scenery, exhibited by Mr. John Saché, was, as might be expected, excellent; being greatly admired, and a source of pleasure to all who saw it; and I much regret, that, as instructed by the Secretary, the awards being given exclusively for exhibits the work of Natives of India, it is beyond my power to recommend that Mr. John Saché receive a mark of approval of the highest class. To Hajee Daroga Abbas Ali Sahib, the well known Lucknow Amateur Photographer, I award a silver medal of the first class, for his excellent Photographic Portraits, in various sizes and styles, of many of the Princes, Rajahs and Nawabs of Oudh and other parts of India, hung up in different parts of the Exhibition room. The copy of the Daroga Sahib's "Album of Oudh Princes and Talukdars" with all the numerous portraits coloured, exhibited in one of the cases, of Loan collection No. 2105, deserves special commendation, and it is

on account of the highly creditable and artistic effect of this Album, that I award to the colourist, Tafusul Hossein, a special prize, of twenty-five rupees, which has been very liberally placed at my disposal, by the Maharajah of Bulrampur. To Ahmed Hossein Khan, Photographic Assistant to the Daroga, who is also deserving of great credit and every encouragement, I award an equal prize (also special) of twenty five rupees.

As regards the loan collection of Oriental MSS. plain and illuminated,—it is of course impossible to award, to-day, prizes to Oriental Caligraphers who flourished, some of them nearly 300 years ago, but their artistic handiwork gave great pleasure to all who saw it, and let us hope that in future Lucknow Exhibitions, other and still better specimens, of the many styles of the wonderfully beautiful and artistic Eastern handwriting, which both illuminated and plain, is the delight of all who examine it, may be exhibited, for the instruction and pleasure of those who take an interest—and who does not ? in such artistic work of by-gone days in India, and the far East generally. Permit me to state here, that I have been deeply gratified by hearing on various occasions during the last few days, many very kind and appreciative critical remarks regarding the beauty and delicacy of these Oriental MSS. exhibits, many of these remarks being made by European and Indian Gentlemen, to whom I am personally quite unknown, others of them, by indulgent Friends. As I said before, we cannot on this occasion, in any way reward Saad, who flourished in 1610 A. D., and who executed the penmanship of the beautiful edition of the Musnavi poems of Jelaludin Er-Roumi (No. 4 of Loan Exhibit 2106), or Muhamad Sadik, the caligrapher of the splendid copy of Firdousi's Shah Namah, written in 1622 A. D. (No. 15 of the same exhibit) and which I am glad to say, has found an appreciative purchaser, in the person of a well known Connoisseur, a member of our local Bar, so that the precious volume will still remain among us. All polo players too, were doubtless interested in the curious and very clever pictures, representing incidents in a polo match between two Eastern Princes, forming the illustrations to a splendid copy of that celebrated Persian poem, the Go-i-chaugān or "Game of Polo," the MS. in question, (No. $\frac{18}{2106}$), having been written and illustrated in 1581 A. D. In like manner Khairat Ali, the painter of the delicate miniature like illustrations to Mir Hassan's Musnavi, (No. 7 of exhibit 2106) must remain undecorated ; nevertheless I am sure, that we all would willingly add another—an English laurel—to the Eastern wreath already on his brow.

The collection of specimens of lithography from the Newul Kishore Press, Lucknow, was got up very hurriedly, and does not do full justice to the famous Establishment, from which the various exhibits were issued. On future occasions it is hoped, that not only the Newul Kishore Press, but several of the many other Printing and Lithographic Presses in Lucknow and Oudh generally, may be fittingly represented. To Munshi Newul Kishore, Sahib, the Proprietor and Manager of the above Press, as also of the "Oudh Akhbar" a daily newspaper of this City, issued in lithographed Urdu, and having the largest circulation in India, I believe, of any Vernacular Paper, is accordingly awarded a specially designed honorable mention, printed in crimson ink on vellum, by Mr. Richard Craven.

To Shaikh Altaf Hossein Khan Sahib, an Honorary Magistrate of Cawnpore, although a Son of Oudh; has been awarded a specially designed Sannad, printed on vellum with golden ink, also by Mr. Craven, as a token of your appreciation of the many and great services he has rendered to the Exhibition generally, and to the Oriental MSS. section in particular, by his kindly introducing to me, several fortunate possessors of valuable Oriental MSS. who were willing to allow them to be exhibited.

In conclusion, I beg to bring to your favorable notice, Munshi Rae Tara Chund, Sahib, Private Secretary to the Maharaja of Balrampur; and Chaudri Nasrat Ali, Sahib, Assistant Secretary to the British India Association. Both these gentlemen were indefatigable in their exertions, and without their aid I could not have brought out the Catalogue in time. Munshi Rai Tara Chund, confessed to me to-day, in strict confidence of course, that one good result of the Exhibition has been, that he has now learnt for the *first time*, that the word "Jade," in vernacular "Sang-i-eashub," is the English name of a well known and highly prized mineral, used in the particular case I refer to, for the handle of a Persian dagger; and that it was a term by no means applicable only to a "*tired horse*" or "*a worthless nag*," the only definitions of "Jade," given in Tara Chund's English Dictionary.

MAHMUDABAD,
20*th March* 1881.

MAJOR C. S. NOBLE,
&c., &c., &c.
LUCKNOW.

MY DEAR MAJOR,

Allow me to carry out my intention as expressed long ago, through my cousin the Raja of Belehra, to you, by placing at your disposal a sum of Rs. 500 in aid of the late Agricultural Show. You will much oblige me in spending as you may like Rs. 200 in expenses tending to give encouragement to the competitors for their industry, and for Rs. 300 purchasing for me some best Ploughs, Water-lifts, and Sugar-mills (Koluhs) and other Machine designed to improve some Agricultural process.

With due respects.

I remain,
My dear Major,
Yours very sincerely,
AMIR HASAN,

To

MAJOR C. S. NOBLE,
Secretary Talukdars' Agri. Meeting.
16*th March* 1881.

DEAR SIR,

I AM in want of two Machines, one for cane crushing, another for corn cleaning, of which I had mentioned you long before. I hope you will be good enough to send them to me, noticing the price of each and the way of their use, that how we can use them. If you have got any printed notice by which we can know their use, please give me that. I shall be very glad to receive the said Machines with thanks. I am all right here and I hope you enjoy the same.

With my best Salaam.

Yours ever truly,
SIRDAR OUTAR SINGH,
Talukdar Lukhore Pattee, Zillah Roy Bareilly.

To

MAJOR C. S. NOBLE,
Secy. Talukdars' Agri. Meeting.
17*th March* 1881.

DEAR SIR,

I WANT a Machine of drawing water from well for irrigation. I hope you will be good enough to manage for it. Please let me know its price and the place where I shall get it.

Yours sincerely,
CHAUDHARY MOHOMED KHASLUT HUSSAIN.

To

MAJOR C. S. NOBLE,
Secretary Talukdars' Agri. Meeting.

MY DEAR SIR,

I WISH to purchase a few things from those exhibited at the Agricultural Show, about which I also spoke to you.

These are

1 Kolhu or a Machine for crushing sugarcane.	2 Ploughs @ Rs. 6 each.	1 Winnowing Machine.

I trust you will intimate the fact to Mr. Wright, the Secretary of the Agricultural and Commercial Association, that he may have the Articles above named sent carefully to the Nawabganj station, where I or my servants shall take charge of them.

Will you be so good as to inform me of the price of the articles above named, that I may send it to you at once.

Yours truly,
QAZIM HUSAIN KHAN.

LUCKNOW :
14*th March* 1881.

CAMP, *Lucknow* 19*th March* 1881.

MAJOR C. S. NOBLE,
LUCKNOW.

MY DEAR SIR,

I SHALL be much obliged if you will enquire of the Director of Agriculture and Commerce, if I may be allowed to send my English servant, Mr. Marsh, together with a native servant, and also my best carpenter and blacksmith, to the Cawnpore Model Farm for three months training from the 1st April. If arrangements could be made for them to live on the farm, and be daily instructed in the method of experimental farming, of keeping in order, adjusting, repairing, and constructing the improved water lifts, ploughs, winnowers, and sugarcane mills &c., I think that after three months careful training my servants would acquire sufficient experience to assist me in starting with some method an experimental model farm at my town and residence, Balrampur. Until my carpenter and blacksmiths learn how to repair, keep in order, and even to make the new and improved agricultural implements I am purchasing, I have but small hope that my model farm will ever be worked satisfactorily.

I would further hope that the Agricultural Department may be able to spare an experienced farm servant who could he deputed from the 1st July next to come to Balrampur, and to remain there assisting in the management of my model farm until the end of January 1882. An early reply will oblige.

Yours sincerely,
DIGBIJAI SINGH,
Maharaja of Balrampur.

Cawnpore, 22nd March 1881.

MY DEAR NOBLE,

About the Sales of Machinery.

We sold on the ground—

1 Winnower @	...	...	Rs.	30	0	0
1 Sugar-mill @ ...	...	...	,,	80	0	0
1 Pump (20′) @ ...	...	...	,,	45	0	0
Do. (13′) @ ...	...	...	,,	35	0	0

We have since received orders (from P. Raj Narain, Rana Shanker Baksh, and Raja Jagmohan Singh) for

3 Winnowers @	...	...	Rs.	30	0	0
3 Pumps @ ...	...	...	,,	48	0	0

But we could have sold *any number* of Pumps and Winnowers had we them on the ground.

Besides, I hope for a lot more indents, and we might issue a Circular to D. C.'s asking them to make known in their Districts, that the Machines Exhibited can be got from us.

Sincerely yours,
J. B. FULLER.

NOTICE.

A Reward of Rs. 200 is offered by the undersigned for the best practical treatise, in Hindi or Urdu, on Improvement in Agricultural in Oudh.

It must deal exhaustively with, and give simple rules (capable of being easily followed and understood by all classes of cultivators) concerning the following points :—

1. Management and improvement of Cattle.

2. Cultivation of good Fodder.

3. Improved methods of sowing seed-grain.

4. How best to lay out and manage a Model Farm of 200 Bighas—for growth of fodder—for experiments in sowing, ploughing, and new modes of irrigation.

5. Drawings and full details as to power, cost, &c., of each and all of the new improved—Winnowers, Water lifts, Sugar-cane Mills, Ploughs, and other Agricultural Implements.

The prize will be adjudged by the Oudh Talukdars' Agricultural Committee at Lucknow, and competitors are invited to send their works direct to the Secretary of that Committee on or before the 1st October, 1881.

RAJAH OF BHINGA,
DISTRICT BAHRAICH, OUDH.

MEMORANDUM.

RANA SHANKAR BAKSH and the Talukdars' Agricultural Committee are to be congratulated on the issue of the following Government Circular No. 14, dated 24th March 1881.

It is almost superfluous to note that this important concession was obtained from Government by the Rana's proposal to establish cattle shows at various annual fairs held in different parts of this Province.

Vide the Rana's paper "Cattle in Oudh" read at the meeting on 19th March, Appendix C.

Vide also His Honor the Lieutenant-Governor's speech (Appendix E.) in public darbar on the 10th March.

C. S. NOBLE.

CIRCULAR No. 14 OF 1881.

[SPECIAL.]

FROM

THE OFFG. SECRETARY TO GOVERNMENT,
N.-W. PROVINCES AND OUDH,

TO

ALL DISTRICT OFFICERS,
N.-W. PROVINCES AND OUDH.

Dated Naini Tal, 24th March, 1881.

SIR,

With the object of stimulating private efforts in the direction of an improvement in the breed of cattle in these provinces, I am directed to inform you that for every Rs. 300 subscribed in any one district, and spent *bonâ fide* on prizes awarded for cattle, at shows or fairs got up with this object, the Lieutenant-Governor and Chief Commissioner will be prepared to allot from provincial revenues Rs. 100 to be devoted to such prizes.

2. Details of the manner in which His Honor would wish these grants utilised will be communicated hereafter by the Director of Agriculture and Commerce, North-Western Provinces and Oudh; through whom all references in connection with this subject, and all applications for the subsidy, should be submitted.

I have the honor to be, &c.,
R. SMEATON,
Offg. Secy. to Govt. N.-W. P. and Oudh.

No. 14A.

COPY forwarded to all Commissioners of Divisions, North-Western Provinces and Oudh, for information.

No. 14B.

Copy also forwarded to the Director of Agriculture and Commerce, North-Western Provinces and Oudh, with the request that he will suggest rules for the carrying out of this measure in the most suitable way.

W. R. BARRY,
Offg. Under-Secy. to Govt. N.-W. P. and Oudh

1881.

FROM

THE DEPUTY COMMISSIONER,
Bahraich.

To

THE SECY. AGRICULTURAL COMMITTEE,
Lucknow.

Dated 28th March,

AGRICULTURAL SHOW AT BAHRAICH.

Undersigned has the honor to inform the Committee that he purposes holding an Agricultural Show at Bahraich during the Syad Salar Mela and would be glad to be informed what assistance the Committee would be prepared to give him towards carrying out the objects of the Show.

Local subscriptions have been promised.

The Mela commences in the last week of May and lasts several days.

M. L. FERRAR,
Offg. Deputy Commissioner.

1881.

FROM

KANWAR HARNAM SINGH, AHLUWALIA,
MANAGER,
Kapurthulla Oudh Estates,

To

MAJOR C. S. NOBLE,
Secretarg Tulukdars Agri. Committee, Lucknow.

BARAITCH :
Dated 31st March } No. 53.

SIR,

I HAVE the pleasure to inform you that the Kappurthala State will subscribe Rs. 100 for the cattle show in the Bahraich District.

I shall feel obliged by your communicating this to the local Government.

I have the honor to be, &c.,

HARNAM SINGH, AHLUWALIA,
Manager, Kappurthala Estates in Oudh.

APPENDIX G.

Statement of receipts and expenditure of money on behalf of the Agricultural Meeting and Exhibition.

Cr.

STATEMENT showing the Receipts and Charges of

No.	Receipts.	Amount.			Total.		
		Rs	A.	P.	Rs.	A.	P.
1	Grant from Talukdar's Association	4,000	0	0			
2	Ditto Secy. Local Agency	1,000	0	0			
3	Ditto Government	3,000	0	0			
4	Subscription from Talukdars &c., ...	1,000	0	0			
5	Collection from sale of tickets	1,203	4	0			
6	Sale proceeds of Catalogues	47	12	0			
7	Ditto Exhibition articles, A.... ...	754	11	9			
8	Miscellaneous	34	0	0	11,039	11	9
	A. In deposit payable to owners Rs. 404-5-0.						
	Grand Total ...	...	...	...	11,039	11	9

Dr.

actual Cash received and the bona fide charges respectively.

No.	Charges.	Amount.			Total.		
		Rs.	A.	P	Rs.	A.	P.
1	Printing	932	[illegible]	0			
2	Advertisements	89	13	6			
3	Telegrams	16	0	0			
4	Articles purchased	653	12	10			
5	Making up cloth bags	298	1	10			
6	Transport charges	215	1	6			
7	Construction of Cattle sheds and Charahi ...	561	0	0			
8	Gram &c. for Cattle	343	9	0			
9	Fireworks	475	0	0			
10	Medals	685	0	0			
11	Amusements	1,015	0	0			
12	Illumination	360	3	0			
13	Money Prizes on { Products ... Rs. 544 0 0; Manufactures „ 615 0 0; Cattle ... „ 825 0 0 }	1,984	0	0			
14	Preparing Catalogues and translation fees &c. ...	160	5	6			
15	Khilut to Chowdhri Nusrut Ali	100	0	0			
16	Bonus to Secy. Tal's. Agri. Meeting	500	0	0			
17	Digging wells	410	14	8			
18	Durbar expenses	121	10	0			
19	Miscellaneous	602	3	0	9,524	4	10
	Balance available ...				1,515	6	11
	Grand Total ...				11,039	11	9

CHAS. S. NOBLE, MAJOR,
Secretary, Talukdars' Agricultural Meeting.

APPENDIX H.

Catalogue of Arts and Manufactures exhibited in the Baradarri, Kaisarbagh.

CATALOGUE

OF

AN EXHIBITION

OF

OUDH ARTS, MANUFACTURES,

AND

AGRICULTURAL PRODUCTS,

HELD

ON THE 8TH, 9TH, & 10TH MARCH 1881,

IN THE KAISAR BAGH, LUCKNOW.

UNDER THE MANAGEMENT OF THE

MAHARAJAH OF BALRAMPUR AND TULSIPUR,

SIR DRIGBIJAI SINGH, BAHADUR, K.C.S.I.,

PRESIDENT OF THE BRITISH INDIA ASSOCIATION,

AND

THE TALUKDARS OF OUDH.

The compiler of this Catalogue, offers it to the Public, with some diffidence It was not, until a few days before the opening of the Exhibition, that Major Noble, B. S. C. (late H. E. I. C. S.), Secretary to the Meeting, asked him to undertake the work; had time permitted, a more complete, interesting, and valuable Catalogue, could doubtless have been prepared.

Such as it is, with all its many patent defects, he offers it to the Public, in the hope that they will excuse its shortcomings, and find it of some use, in guiding them through the interesting collection of articles now shown in the Kaisar Bagh Baradari, most of them the production, either of this Historical City—the Paris of India;—or of Oudh—the Garden of India.

LUCKNOW,
The 8th March 1881.

ARCHIBALD CONSTABLE,
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THIS CATALOGUE

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TUESDAY THE 8TH DAY OF MARCH 1881, A. D.

SALE CATALOGUE.

Serial number.	Name and description of article.	Name of owner, his parentage and residence.	Place where manufactured or sold.	Manufacturer's name.	Price of article, if for sale.	Remarks.
1	Ghi, from buffalo milk ...	Rustum, Goojar	Utter Gaon zilla Sultanpore.	Rustum ...		Received through the Deputy Commissioner of Sultanpur.
2	Metal cup, without cover,	Narain ...	Bundhwa Kalan Sultanpore.	Narain Thathara (Brahman)		Ditto.
3	Wine glasses, two ...	Dltto.	Ditto.	Ditto.		Ditto.
4	Tea cup and plate ...	Mungal ...	Ditto.	Mungal ...		Ditto.
5	Two water glasses ...	Narain, Thathara.	Ditto.	Narain ...		Ditto.
6	Cup with cover ...	Ditto.	Ditto.	Ditto.		Ditto.
7	Ghi ...	Laloo, Ahir ...	Mahmoodpore Pargana Uldaimao Zilla Sultanpur.	Laloo ...		Ditto.
8	Sheet of native canvas ...	Kazi Hashim Ali, of Ram Nagar	Ramnagar ...	Ditto.		
9	Raw jute thread ...	Prag, Brahman	Gudwara in Sultanpur.	Prag ...		No. 9 to 21 from Deputy-Commissioner Partabgarh.
10	Twisted jute thread ...	Baichoo Hanooman Gunj ...	Hanooman Gunj Zilla Partab Gurh.	Baichoo ...		
11	Sheet of native canvas...	Prag Brahman,	Gudwara Zilla Partabgarh.	Prag ...		
12	Ditto.	Ganaish Koorini,	Dalol, Zilla Partabgarh.	Ganaish ...		
13	White blanket ...	Tehseeldar of Kunda	Kunda, Zilla Partabgarh.			
14	Indian hemp or jute ...	Do. of Putli ...	Hanooman Gunj Zilla Partabgarh			
15	Burning clay ...	Do. Kunda ...	Ditto.			
16	Bed cover ...	Dost Mahomed Khan Talooquadar-	Nawabganj ...			
17	Coverlet for a bed ...	Ditto.	Ditto.			
18	Bed sheet ...	Ditto.	Ditto.			
19	Thin cloth (ver: "lahi"),	Roy Srubjeet Singh.	Bhudri of Partabgarh.			
20	Green, "Kirkri" cloth ...	Ditto.	Ditto.			
21	Garha or towel cloth ...	Ditto.	Ditto.			
22	Resin ..	Mahaish Bux a grant holder.	Hardutnagar Zilla Bahraich.			
23	Soft blanket, white ...	Sirdar Heera Singh.	Charda, Zilla Bahraich.			
24	Do. black ...	Mahadeo Pershad of Mullhipore.	Rundwa Zilla Bahraich.			
25	Do. do. ...	Ditto.	Ditto.			
26	Indigo ...	Nawab Nawazish Ali Khan Charda.	Mahadaiwa Zilla Partabgarh.			
27	Lac ...	Rajah of Nanpara.	Nanpara „			
28	Wool ..	Ditto.	Ditto.			
29	Baskets ...	Tehsildar of Nanpara.	Lokahi ...	Tharoos,		
30	Ditto.	Ditto.	Ditto.	Ditto.		
31	Ditto.	Ditto.	Ditto.	Ditto.		
32	Ditto.	Ditto.	Ditto.	Ditto.		

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33	A cushion for putting on the head when carying load.	Tehsildar of Nanpara.	Lokai ...	Tharoos ...				
34	Lotah, of bell metal ...	Balai ...	Bahraich, Sheopore.	Balai, Thathaira				
35	Ditto.	Ditto.	Ditto.	Ditto.				
36	Lotah, of Pewter ...	Ditto.	Ditto.	Ditto.				
37	Drinking cup, of bell metal.	Ditto.	Ditto.	Ditto.				
38	Lotah of bell metal ...	Nabi Bux ...	Nanpara ...	Nabi-Bux ...				No. 22 to 43 send by the Deputy Commissioner, Partab Garh.
39	Butwi of do. ...	Barati, brick layer.	Ditto.	Barati ...				
40	Lotah of do. ...	Ditto.	Ditto.	Ditto.				
41	Ditto.	Ditto.	Ditto.	Ditto.				
42	Honey ...	Raja of Nanpara,	Nanpara ...	Ditto.				
43	Bhang ...	Raja of Nanpara,	From hemp grown in Nanpara.	Nanpara ...				
44	A glass mirdung ...	Syad Ali ...	Lucknow ...	Syed Ali ...	15	0	0	
45	Crystal wine glass ...	Ditto.	Ditto.	Ditto.	3	0	0	
46	Ditto.	Ditto.	Ditto.	Ditto.	2	0	0	
47	Ivory box ...	Banda Ali Khan,	Lucknow ...	Banda Alli Khan,	100	0	0	
48	A worked sheet ...	Abdool Rahman, of Delhi.	Lucknow ...	Abdool Rahman,	45	6	0	
49	Ditto.	Ditto.	Ditto.	Ditto.	61	4	0	
50	A worked "doputta" ...	Ditto.	Ditto.	Ditto.	55	0	0	
51	Verses written by Hafiz Mahomed Baki.	Abdool Rahman,	Lucknow ...	Abdool Rahman	100			
52	Earthen plate and cup ...	Deputy Commissioner Bara Banki.						
53	Brass temple (Shewala)	Gian Dass, Goldsmith.	Ditto.	Gian Dass ...	1,500	0	0	
54	Almond sweetmeat with plate.	Nabi Bux of Goshaeengunj Lucknow.	Goshaeen Gunj,	Nabi Bux ...	3	8	0	
55	Date made of sugar ...	Ditto.	Ditto.	Ditto.	2	8	0	
56	Do. with plate ...	Ditto.	Ditto.	Ditto.	3	0	0	
57	Cardamom do. ...	Ditto.	Ditto.	Ditto.	4	0	0	
58	Hulwa *Anglice*, "toffee"	Ditto.	Ditto.	Ditto.	0	14	0	
59	Melon made of sugar ...	Ditto.	Ditto.	Ditto.	2	0	0	
60	Bread made from almonds	Ditto.	Ditto.	Ditto.	2	0	0	
61	Ornamented cake ...	Ditto.	Ditto.	Ditto.	2	8	0	
62	Glass jar containing crystatised cocoanut.	Ditto.	Ditto.	Ditto.	2	4	0	
63	Ditto.	Ditto.	Ditto.	Ditto.	2	6	0	
64	Ditto.	Ditto.	Ditto.	Ditto.	2	6	0	
65	Ditto.	Ditto.	Ditto.	Ditto.	2	6	0	
66	Bombay chatnis ...	Ditto.	Ditto.	Ditto.	2	6	0	
67	Ditto.	Ditto.	Ditto.	Ditto.	2	8	0	
68	A jar of preserved fruit ...	Akram Ali Rakabdar	Lucknow	AkramAli				
69	,, ,, lemon ...	ditto	ditto	ditto				
70	,, ,, orange ...	ditto	ditto	ditto				
71	,, ,, falsa ...	ditto	ditto	ditto				
72	,, ,, karela ...	ditto	ditto					
73	,, ,, khirnee ...	ditto	ditto					
74	,, ,, eggs in sugar	ditto	ditto					
75	Chutnee made with nine spices, and called on that account "Naoratun," ...	ditto	ditto					
76	Black pepper preserved in syrup ...	Nasir Ali Rakabdar	ditto	Nasir Ali	2	4	0	
77	Chili in do. ...	ditto	ditto	ditto	2	2	0	
78	Cocoa-nut in syrup, fancifully cut out side ...	ditto	ditto	ditto	2	6	0	

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79	Do. do. without ornamnt	Nasir Ali	Lucknow	Lucknow	2	6	0	
80	Eggs preserved in syrup ...	ditto	ditto	ditto	2	8	0	
81	Citron, preserved in syrup	ditto	ditto	ditto	2	8	0	
82	Sugared almonds	ditto	...		1	12	0	
83	Cowries, made of sugar ...	ditto	...		2	0	0	
84	Chiknee Dulee, *i. e.*, betel nut boiled in milk ...	...	...		1	12	0	
85	Mulberry sweetmeat ...	...	...		0	12	0	
86	A cake of the Sulaimani receipe	...	...		2	0	0	
87	Melon seed sweetmeat ...	...	...		0	12	0	
88	Mangoe do. ...	...	...		0	8	0	
89	Cap, with needle work embroidery in silver wire ...	Wali Ahmud of Punjabi Tola	Lucknow	Wajad Ali	5	12	0	
90	Do. do. ...	ditto	ditto	ditto	4	0	0	
91	Ghee	Anunt Singh of Patenda Tehseel Lucknow	Painda	Anunt Singh				
92	A cane travelling basket, or pitarah	...	Gonda	...				
93	Palm leaf fan	...	Utroula Zillah					
94	Endwa, a cushion used by coolies to protect their heads when carrying loads	...	Gonda Utraula in Gonda	...				
95	Coloured earthen cups ...	...	ditto					
96	Baskets, made by the "Tharoos" a very interesting aboriginal race in Oudh...	...	ditto					
97	Coloured flower-pot ...							
98	„ earthen plate ...							
99	„ „ basin ...							
100	A "kulgi," head ornament, set with pearls and emeralds. The kulgi was only allowed to be used by persons of distinction and corresponds in some respects to European insignia of honour, such as the Star of India, &c. &c.	Lala Ram Dass of the firm of Chuppa Mull, Bankers	Lucknow	...	425	0	0	
101	Ghee	Babu Ram Sahoy of Rutni Zillah Unao	Rutni					
102	Thalee of bell metal ...	Teekarm Newulgunj Zillah Unao	Newulgunj	Teekaram				
103	Do. do. ...	ditto	ditto	ditto				
104	Brass prát or thali ...	ditto	ditto	ditto				
105	Do. do. ...	ditto	ditto	ditto				
106	Lota, of bell metal ...	Thakurpershad	ditto	Thakurpershad				
107	„ of brass	Bhawanipershad	ditto	Bhawnipershad				
108	„ of bell metal ...	Chundee Deen	ditto	Chundi Deen				
109	„ kamrukhi, *i. e.*, like fruit of that name ...	ditto	ditto	ditto				
110	Butwa, or rice pot ...	Goordyal	Monan	Goordyal				
111	Lota of brass	Bhawanipershad Newulgunj	Newulgunj	Bhawanipershad				
112	„ of bell metal ...	Thakurpershad Copper-smith	ditto	Thakurpershad				
113	A small cup	Neelkunth	ditto	Neelkunth				
114	A large do.	ditto	ditto	ditto				
115	A tumbler of metal ...	Sheo Dyal	ditto	Sheo Dyal	3	0	0	
116	Small lotah	Bhugwan Deen Newulgunj Zilla Unao	ditto	Bhugwandeen				

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117	Small lotah	Bhugwandeen	Newulguuj	Bhugwandeen	...	...	...	Exhibits Nos. 102-123 received through the Dy. Comr. of Unao.
118	"Tumbler" of bell metal...	Sheo Dyal	ditto	Sheodyal				
119	Brass chain	Neelkunth	ditto	Neelkunth				
120	Thal, or tray of pewter ..	ditto	ditto	ditto				
121	Do. large	ditto	ditto	ditto				
122	Kulsa, water bowl of brass	Teekaram	ditto	Teekaram				
123	Sheep wool felt, mattress...	Elahi Bux	Bahraich	Elahi Bux	3	0	0	
124	Numda 4 × 6	ditto	ditto	ditto	3	0	0	
125	" 10 × 10	Misree	ditto	Misree	19	0	0	
126	" 8 × 8	Ala Bux	ditto	Alabux	10	8	0	
127	12 × 12	Elahi Bux	ditto	Elahibux	22	0	0	
128	Numda 4 × 6	Kulloo	ditto	Kullo	3	8	0	
129	" 4 × 6	Budhoo	ditto	Budho	3	0	0	
130	" 6 × 4	Ala Bux	ditto	Alabux	3	0	0	
131	" 8 × 8	Janoo	ditto	Jonoo	10	8	0	
132	" 8 × 8	Jhugroo	...	Jhughroo	11	8	0	
133	Black blanket	Daibi, Garurya, Bahraich	Parusrampore	Daibi	2	4	0	
134	Striped do.	Gubrai do.	Pearghat	...	3	8	0	
135	Do. do. 6 × 4 ...	Samadhan	ditto	Samadhan	3	0	0	
136	Bell metal hookah ...	Buldi	ditto	Buldi	3	5	0	
137	Honey, collected in the cold weather, called chakanta or frozen... ...	Mahin Lall	Bhinga	Mahinlal		8	0	
138	Lotah of bell metal ...	Buldi	Bahraich	...	3	10	0	
139	Pateeli or wide mouthed cooking pot do. ...	Ram Chundi in zillah Bahraich	ditto	...	2	10	0	
140	Thali do.	ditto	ditto	...	3	8	3	
141	Lac	Mahpal Singh	Pragpore	Mahpal Singh				
142	Semul cotton	Nehchul in Ranipur	Ranipore	...				
143	Sheeps wool	Daibi Garurya	Prusrampore	...				
144	Blanket with coloured stripes	Bahraich Jail	...	..	1	14	0	
145	Do. white	ditto	...	..	1	11	9	
146	Do. black	ditto	..	..	1	12	6	
147	Brass cooking pot... ..	Mukhdoom Kasara	Bahraich	Mukhdoom	4	7	9	
148	Cleaned wool, prepared for numda	Suhbut Chowdhri	ditto	Suhbut chowdhri				
149	Brass hookah	Punchum Goldsmith	Cawnpore	Punchum				
150	Do.	ditto	ditto	...				
151	Pateeli, of pewter... ...	Bijailall, brass smith	Radhaepore	Bijailall				
152	Daigchi do.	Mulloo do.	ditto	Mulloo				
153	Pateelee of pewter ...	Ramsahai	Radhaepor Court of Words	Ramsahai				
154	Mainpuri work, box ...	Jamahir Mainpuri	Mainpuri	Jawahir	50	0		
155	" plate	ditto	ditto	ditto	8	0	0	
156	" "	ditto	ditto	ditto	8	0	0	
157	" "	ditto	ditto	ditto	8	0	0	
158	" "	Mujnoon Mistri	ditto	Mujnoon	11	0	0	
159	" Box	ditto	ditto	ditto	12	0	0	
160	Five small plates, 10 large	Jawahir	ditto	Jawahir	9	0	0	
161	Pen tray	Ghasi	ditto	Ghasi	25	0	0	
162	"	ditto	ditto	ditto	2	0	0	
163	Book-shelf...	Ghasi	ditto	ditto	5	0	0	
164	"	ditto	ditto	ditto	5	0	0	
165	Pen case	Jaikishun	Cawnpore	Jaikishun	8	0	0	
166	Plates	Jawahir	Mainpori	Jawahir	12	8	0	
167	"	ditto	ditto	ditto	12	8	0	
168	"	Ghasi	ditto	Ghasi	10	0	0	
169	"	Jawahir	ditto	Jawahir	16	0	0	
170	"	ditto	ditto	ditto	14	0	0	
171	"	ditto	ditto	ditto	20	0	0	
172	Ebony pen tray	ditto	ditto	ditto	2	0	0	

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173	Ebony pen tray ...	Jawahir	Mainpuri	Jawahir	1	8	0	
174	„ Box	...	...	...	9	0	0	
175	A large ebony box ...	...	...	...	8	0	0	
176	A small „	...	...	...	8	0	0	
177	A bookshelf	...	...	...	7	4	0	
178	Ebony pen case	...	...	...	2	0	0	
179	„ English pattern ...	...	...	...	1	0	0	
180	Ebony paper case... ...	...	...	...	10	0	0	
181	Ebony paper knife ...	...	...	...	0	14	0	
182	Glass	...	...	...	1	8	0	
183	Sandal wood box	...	...	...	7	0	0	
184	Earthen pots of sorts, (26)	From Cawnpore	Cawnpore					
185 to 210	Water tumbler, fluted, bell metal	Ganaishi Thathra	Bahraich	Ganaishi	2	0	0	
212	Hathi Chinghar, elephant grass, yields a good fibre	...	Oonao					
213	Artificial flower pot ...	Ali Mahomed Cashmiri	Lucknow	Ali Mahomed	3	0	0	
214	Sheet of paper, gilt, with verses written on it ...	ditto	ditto	ditto	10	0	0	
215	Gold bordered paper, used for complimentary or ceremonial letter ...	ditto	ditto	ditto	32	0	0	
216	Thali, Moradabad work, No. 1733	Ahmedyar Khan of Moradabad	Moradabad	Ahmudyar Khan Merchant	30	0	0	
217	„ „ No. 1736	ditto	ditto	...	15	0	0	
218	„ „ „ 1735	ditto	ditto	...	12	0	0	
219	„ „ „ 3	ditto	ditto	...	7	0	0	
220	„ „ „ 1590	ditto	ditto	...	12	0	0	
221	„ „ „ 1623	ditto	ditto	...	8	0	0	
222	Flower pot „ „ 1489	ditto	ditto	...	15	0	0	
223	„ „ „ 1490	ditto	ditto	...	15	0	0	
	Berlin wool work, Pictures	Mrs. McBrien	Lucknow	Mrs. McBrien	50	0	0	
1260-1	Madonna and Child ...							
1260-2	Last Supper	ditto	ditto	ditto	55	0	0	
1260-3	Roman Lady feeding a bird	ditto	ditto	ditto	60	0	0	
1260-4	Peasant girl selling flower	ditto	ditto	ditto	60	0	0	
1260-5	Australian Parrot ...	ditto	ditto	ditto	25	0	0	
1260-6	English (?) do. ...	ditto	ditto	ditto	25	0	0	
1260-7	Charles I, bidding adieu to his children	ditto	ditto	ditto	30	0	0	
1260-8	Mary, Queen of Scots, forgiving her enemies ...	ditto	ditto	ditto	30	0	0	
224 to 239	Moradabad work	Ahmedyar Khan	Moradabad	Ahmedyar Khan				
240 to 393	Ditto	Birj Mohun Lall	ditto	Birj Mohun Lall	...	...	...	For prices see separate price list.
394 to 455	Ditto	Sham Lall	ditto	Shiam Lall				
456 & 57	Marble top tables ...	Nawab Syed Mehdi Ali Khan	Lucknow	...				
453	Mirdung	ditto	...	...				
459 to 460	Kite string roller, with stand	ditto	...	...				
461	Hookah, green glass ...	ditto	...	...				
462	Do. purple „ ...	ditto	...	...				
463	Candle shade green ...	ditto	...	...				
464	Jade handle	ditto	...	...	...	...	...	As per private arrangement with the Nawab.
465	Gold bidree handle ...	ditto	...	...				
466	Book of flower pictures ...	ditto	...	...				
467	Necklace set with jewels...	ditto	...	...				
467	Crystal cup	ditto	...	...				
468	Betel nut &c. box ...	Nawab Saidun Ali Khan	...	...				
469	Bangles, embroidered ...	Mehdi Hussun	Lucknow	...	8	8	0	
470	Boots do. ...	ditto	ditto	...	11	0	0	

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471	Tray cover ...	Mehdi Hussun	Lucknow	...	18	0	0	
472	Do. do. & painted	...	ditto	...	8	4	0	
473	Velvet necktie	...	ditto	...	2	8	0	
474	Ditto	Kullun Shaikh	ditto	...	...	...	...	
475–76	Paper weights	ditto	ditto	...	10	0	0	
477	Stone box	ditto	ditto	...	20	0	0	
478	Do. pen case	ditto	ditto	...	15	0	0	
479	Do. plate	ditto	ditto	...	8	0	0	
480	Do. chessmen, &c. ...	ditto	ditto	...	45	0	0	
481	Striped shawl	Meer Mohomed Kashmiri	Lucknow	...	625	0	0	
482	Red Shawl or Jamawar ...	ditto	ditto	...	400	0	0	
483	Shawl for night sheet, rose colour	ditto	ditto	...	300	0	0	
484	Shawl Jamawar rose colour,	ditto	ditto	...	200	0	0	
485	Large handkerchief shawl, white	ditto	ditto	...	275	0	0	
486	Jamawar	ditto	ditto	...	150	0	0	
487	Do.	ditto	ditto	...	150	0	0	
488	Do.	ditto	ditto	...	300	0	0	
489	Razaee, shawl	ditto	ditto	...	200	0	0	
490	Jamawar, white	ditto	ditto	...	210	0	0	
491	Do.	ditto	ditto	...	200	0	0	
492	Silk sotin, Dooputta, with lace border ...	Bunwari Doss	ditto	...	75	0	0	
493	Do. do. ...	ditto	ditto	...	60	0	0	
494	Coat, embroidered, purple,	ditto	ditto	...	255	0	0	
495	Chicken work	ditto	ditto	...	42	0	0	
496 to 98	Precious stones engraved with verses from the Holy kuran	Abdool Wahid	ditto	...	122	0	0	
499	Ring do. ...	ditto	ditto	...	25	0	0	
500	Bel metal, water jug ...	Mohamed Ahmud	Bahraich	...	1	8	0	
501	Do. Cup ...	ditto	ditto	...	...	14	0	
502	Sheet of kamdani work ...	Chunni Lall	ditto	...	...	...	...	
503	„ chikun „ ...	ditto	ditto	...	17	2	0	
504	Cap, embroidered... ...	ditto	ditto	...	...	...	...	
505	Waist coat do.	ditto	...	...	95	8	0	
506	Lace embroidery	ditto	ditto	...	64	0	0	
507	Do. do. ...	ditto	...	...	64	0	0	
508	Coat chikun work... ...	ditto	...	...	16	2	0	
509	Waist coat do.	...	...	...	8	6	0	
510	Sheet do.	...	...	...	4	12	0	
511	„ do.	...	...	...	11	9	0	
512	„ with silver work ...	...	...	...	4	0	0	
513	„ ...	...	...	...	...	11	0	
514	„ ...	...	...	...	4	11	0	
515 to 30	Pictures	Ram Narain	...	...	58	0	0	
531	Shahnamah, illustrated, (transferred to Loan collection No. 2106 which see for details) ...	Aga Haidar	Persia	...	45	0	0	
532 to 40	Paper flowers cut out by scissors	Rustum Beg, Duftari	Lucknow	...	...	...	...	
541	Ghee	Nawazish Ali ...	Hardoi	...	...	...	...	
542	Ivory chessmen	...	...	...	200	0	0	
543	Gold Watch with enamelled picture on back ...	Seetul Pershad, Watch-maker...	Lucknow	...	100	0	0	
544	Do. do. ...	...	ditto	...	100	0	0	
545	Shawl, over coat	Raza Hussein ...	...	...	75	0	0	
546	Handker-chief, needle-work	„	...	...	100	0	0	
547	China Shawl	„	...	...	150	0	0	
548	Razaie	...	...	...	200	0	0	
549	Shawl, English pattern...	...	...	...	300	0	0	

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550	Shawl rose coloured, ...	...	...	...	300	0	0	
551 & 52	Needlework Caps... ...	...	...	...	50	0	0	
553 to 56	Do. ...	...	...	...	20	0	0	
557 to 60	Do. ...	...	...	...	15	0	0	
561	Muslin, 2 pieces ...	Hafiz Nujjo ...	Lucknow	...	16	0	0	
562	Do. ...	Hurgobind ...	ditto	...	22	0	0	
563	Do. ...	"	ditto	...	25	0	0	
564 to 69	Cloth of sorts	"	ditto	...	...	...	...	
570 to 74	Kamdani-work	Sheo Narain ...	ditto	...	...	...	...	
575 to 77	" ...	Bhondoomul ...	ditto	...	...	...	...	
578	" ...	Elahibux ...	ditto	...	125	0	0	
579	" ...	Manohur Dass ...	ditto	...	70	0	0	
580	" ...	Madhoram ...	ditto	...	50	0	0	
581 to 83	Coat ornamental-work ...	...	ditto	...	...	...	...	
584	Chikun-work piece ...	Bhondoomul ...	ditto	...	10	0	0	
585	Silk Cap, needle-work ...	Pundit Baij Nath	ditto	...	...	...	...	
586 & 87	Chikun-work muslin ...	Budri Dass ...	ditto	...	...	...	...	
588 to 92	" " ...	Jagun Nath ...	ditto	...	...	...	...	
593 & 94	" " ...	Mahomed Shair Khan	ditto	...	...	...	...	
595 to 99	" " ...	Brij Mohun ...	ditto	...	...	...	...	
600 to 606	" " ...	Elahibux ...	ditto	...	...	...	...	
607 to 12	" " ...	Gungi Mul ...	ditto	...	...	...	...	
613 to 22	" " ...	Moorli	ditto	...	...	...	...	
623 to 25	" " ...	Madhoram ...	ditto	...	...	...	...	
626	Over-coat embroidered with Silk	Mahomed Nawaz Khan ...	ditto	...	60	0	0	
627 to 48	Chintz of sorts	Bhugwan Dass ...	...	...	...	...	...	
649 to 62	Lucknow chintz-work ...	Jagun Nath ...	Lucknow	...	...	...	...	
663 to 67	do. ...	Elahibux ...	ditto	...	...	...	...	
668 to 77	Bidri-work	Bhoolun... ...	ditto	...	...	...	...	
678	Ornamental top for hookha	Jeewunbux ...	ditto	...	...	...	...	
679	Soorahi " "	Mahomed Ali ...	ditto	...	17	12	0	
680	Hookha " "	...	...	...	18	0	0	
681	Snake for "	Mahomed Beg ...	ditto	...	80	0	0	
682 to 85	" " "	Bhoolun... ...	...	...	...	...	...	
686 to 95	" " "	Mahomed Beg ...	ditto	...	...	...	...	
696	Hookha	Pundit Sheo Nath, Pleader ...	...	...	...	...	...	
697	Iron box, gold inlaid ...	"	...	...	...	...	...	
698	Glass Tazia	Bashaishur ...	...	...	...	...	...	
699 to 712	Toys	Bhawani Deen ...	...	...	4	0	0	
713 to 34	Earthen-ware	Golal	...	...	...	...	...	
735 to 46	" toys	Bhawani Deen ...	...	...	...	...	...	
747	Picture of H. R. H. the Prince of Wales ...	Gopal Dass	Lucknow	...	20	0	0	Price mark on the article.
748 to 54	Earthen ware	Shunkur Lall	ditto	...	...	...	...	
755	ditto ...	Ghunsiam Dass	ditto	...	5	0	0	
756	ditto Dooli ...	ditto	ditto	...	4	0	0	
757 to 67	ditto fruits ...	Girdhari Lall	ditto	...	...	...	...	
768 to 70	ditto ...	Budhia	ditto	...	...	...	...	
771 to 80	ditto ...	Gungoo	ditto	...	...	...	...	
781 to 84	ditto ...	Bhawani Deen	ditto	...	...	...	...	
785	Model of a horse ...	Birj Mohun	ditto	...	1	0	0	
786	" Bengali Baboo made of paper	Moolchund	ditto	...	5	0	0	
787	Model of an old durwan ...	Kundhie	ditto	...	5	0	0	
788	Paper elephant, large ...	Bishun	ditto	...	40	0	0	
789	Indian fruits models ...	Bhawani Deen	ditto	...	...	...	...	
790	Foreign fruits do. ...	ditto	ditto	...	...	...	...	
791	Moonj string	Lala	...	...	...	...	...	
792	ditto	Jagun Nath	...	...	...	...	...	
793	Verdegris	Moozuffer Hossain	Lucknow	...	...	...	...	
794	Kite string	Ahmud Ali	ditto	...	...	...	...	
795	do. variegated colours ...	ditto	ditto	...	...	...	...	
796	do. do. ...	Moolchund	ditto	...	...	...	...	

Serial Number.	Name and description of articles.	Name of owner, his parentage and residence.	Place where manufactured or sold.	Manufacturer's name.	Price of article, if for sale.			Remarks.
797	Kite string	Moolchand	Lucknow	...	...	...	...	
798 to 805	Scents	Ram Narain	ditto	...	...	...	...	
806 to 809	Brass and Copper ware ...	Jeemun Bux	ditto	...	...	...	...	
810	Glass cup with plate ...	Hossain Ali	ditto	...	9	0	0	
811 to 817	Brass ware	Jeewun Bux	...	...	...	...	...	
818 to 820	Velvet coat, embroidered...	Jawahir Lall	...	...	...	...	...	
821	Har or necklace	Daibi Deen	...	...	...	...	...	
822 to 826	Embroidery work... ...	Sheo Narain	...	...	...	...	...	
827	Cap with bag as worn by the courtiers of the Ex-King	Budhi	...	...	9	0	0	
828	Umbrella embroidered with gold	Girwur Moochi	...	...	...	...	...	
829	Black velvet coat do. ...	Sheo Narain	...	...	1,800	0	0	
830	Embroidery work do. ...	ditto	...	...	...	...	...	
831 to 835	do. do. ...	Rughbur Sahai	...	...	...	...	...	
836 to 841	do. do. ...	Chuppa Mull	...	...	...	...	...	
842 to 849	do. do. ...	Budri Dass	...	...	...	...	...	
850 to 863	do. do. ...	Purshadi Lall	...	...	...	...	...	
864 to 866	do. do. ...	Kishori Lall	...	...	...	...	...	
867	Cap with bag, embroidered	Kidar Nath	...	...	150	0	0	
868	do. do. ...	Ram Sarun	...	...	4	5	0	
869	do. do. green	ditto	...	...	4	5	0	
870 to 79	Embroidery	Kishori Lall ...	...	...	...	...	...	
880	do. a saddle cloth ...	Khunkhun Lall...	...	...	450	0	0	
881	Cap worked with verses by needle	Buldeo Doss ...	...	...	10	0	0	
882 to 90	English chep and other wooden furniture ...	Elahi Bux ...	...	...	...	...	...	
891	Silver bracelet case ...	Doorga Pershad...	...	...	...	...	...	
892	,, hukkah Fttings ...	Narain Doss ...	...	...	...	...	...	
893	,, duck	do. ...	...	...	3	6	0	
894	Artificial diamonds ...	Kullun Khan ...	Lucknow	...	...	...	...	
895 to 901	Silver jewels, native ...	Manohur Doss ...	...	...	...	...	...	
902	Silver belt, ...	Chuppa Mul ...	...	...	18	6	0	
903	Head ornament	do. ...	...	...	100	...	...	
904	Silver water jug	Baboo Besheshur Nath	...	...	37	8	0	
905	,, hukka	do. ...	...	...	49	8	0	
906	,, belt	Ajodhya... ...	...	...	15	...	...	
907	Scent box	Besheshur Doss...	...	...	...	...	...	
908 to 13	Silverwork, Kashmeri patn :	Baijnath... ...	Lucknow	...	...	...	...	
914 to 918	,, ,, ...	Chuni Lall ...	...	...	...	...	...	
919 to 29	,, ,, ...	Doorga Pershad	...	...	...	...	...	
930	Silver chandelier	Mungal Baboo ...	...	...	15	0	0	
931	,, ,, ...	do. ...	...	...	15	0	0	
932 to 38	,, ornaments ...	Gopal Doss... ...	...	...	...	...	...	
939	Gold necklace	Nuwab Vazeer Mirza	...	...	...	...	...	Not for sale.
940	Silver ring	Brij Mohun Lall	...	...	10	0	0	
941	,, sorahi	Bhugwan Doss	...	...	138	8	0	
942	,, clogs	Seetaram	...	...	...	...	...	
943	,, water jug	ditto	...	...	67	8	0	
944	,, ,, ...	ditto	...	...	67	8	0	
945	,, sorahi with stand ...	ditto	...	...	134	0	0	
946	,, ,, small... ...	ditto	...	...	32	0	0	
947	,, tray	ditto	...	...	132	0	0	
948	,, betel case	ditto	...	...	80	0	0	
949	,, sugar pot	ditto	...	...	51	0	0	
950	,, milk jug, ...	ditto	...	...	36	0	0	
951	Shoes, embroidered ...	Mehdi Hassun	...	...	21	0	0	
952	Boots ,, ...	ditto	...	...	20	0	0	
953	Shoes, green velvet ...	Birj Mohun	...	Aga Mirza	10	0	0	
954	Boots dark purple velvet...	Haji Rahim Bux	...	ditto	1	0	0	
955	,, green ,, ...	ditto	...	ditto	1	0	0	
956	,, ,, ,, ...	ditto	...	ditto	1	0	0	

Serial number.	Name and description of article.	Name of owner, his parentage and residence.	Place where manufactured or sold.	Manufacturer's name.	Price of article, if for sale.			Remarks.
957	Shoes, embroidered with Delhi work	Jafar Hossain	...	ditto	1	10	0	
958	" " ...	ditto	...	...	1	8	0	
959	Lady's shoes Delhi work...	ditto	Lucknow	...	2	0	0	
960	Arabic shoes, yellow velvet	Ali Bux	"	...	1	12	0	
961	Shoes shagreen bather ...	ditto	"	...	1	8	0	
962 to 66	Necklace of paper flowers	Syed Hossain	...	...	1	0	0	
967	Silver braid	Kishori Lall	...	...	9	8	0	
968 to 973	Gold braid of sorts ...	ditto	...	...	various			
974 to 984	" "	Kidar Nath	...	...	"			
985 to 988	" "	Ram Sarun	...	...	"			
989	Cap, embroidered ...	Chuttun	...	...	10	0	0	
900 to 993	" "	Raghbeer Sahoy	...	...	various			
994	Silver spittoon	Seetaram	...	...	...			
995 to 1005	Tea set, silver	...	...	...	...	...	...	As marked.
1006	Gold earrings	Mr. Cline	...	Nund Lall, goldsmith	...	0	0	
1007	Broach	ditto	...	...	...	0	0	
1008	Saddle cloth, imbroidevc,	Haidar Hossain	Ditto.		250	0	0	
1009 to 77	Scents, jasmine &c., ...	Asghur Ali	Lucknow		8	0	0	
1078	Enamelled silver pawn box,	Doorga Cershad	Ditto.		24	6	0	
1079	" silver spittoon ...	Sanwuldop by Nath	witto.		270	0	0	
1080	" " square betel box	Ditto	Ditto,		140	0	0	
1081	Hookha snake with fittings, enamelled ...	Pundit Bashaishar Nath	Ditto.		3	0	0	
1082	Silver, enamelled sorahi ...	Saorwul Dop	Ditto.		61	0	0	
1083	Cocoanut shaped hookha ...	Babo Ram Gold Smith	Ditto.					
1084	Ivory toys	Jagun Nath	Ditto.		20	0	0	
1085	Varinshed, cot legs white,	Ameer Ali	Lucknow			6	0	
1086	Green ...	Ditto	Ditto,			12	0	
1087 to 94	Painted sticks &c., of sorts,	Ditto	Ditto.					
1095 to 1100	Carpets, cottom of sorts ...	Hazari Lall						
1101	Sarin ghi, native musical instrument ...	Karim Bux			16	0	0	
1102	Leather box, small ...	Ditto			12	0	0	
1103 to 8	English ornaments, silver,	Sheodeen Gold Smith						
1004 to 12	Sweetmeat of sorts ...	Kasim Ali Rakabdar						
1013	Ditto do. ...	Ameer Ali						
1014 to 16	Ditto do. ...	Fyaz Ali						
1017 to 19	Ditto do. ...	Karim bux						
1120	Marble topped table ...	Nawab Vazir Mirza Sahib						
1121	Ditto do. ...	Ditto.						
1122	A glass tumbler engraved Arabic letters ...	Mozaffer Hussain						
1123	Ditto do. ...	Ditto.						
1124 to 28	Candle shades graved with verse	Pundit Bisheon Narain						
1129	Poems written in a good hand	Nawab Hohamed Jafar						
1130	Ditto do. ...	Ditto.						
1131	Looking glass, with Empress of India, eugraved thereon	Pundit Bishen Narain						
1132	Hookha snake ...	Bunsidhur			1	0	0	
1133	Lota, white glass ...	Ditto.				12	0	
1134	Mirdung, green ...	Ditto.			1	0	0	
1135	Brackets	Rujjolall			4	8	0	
1136	Glass, Goorgori hookah ...	Ditto.						

Serial Number.	Name and description of article.	Name of owner, his parentage and residence.	Place where manufactured or sold.	Manufacturer's name.	Price of article, if for sale.			Remarks.
1137	Anar a sort of firework ...	Hussun Ali			1	0	0	
1138	Ditto do. small ...	Janoon			5	0	0	
1139	Ghori, a sort of China-ware plate	Elahi bux	...	..	50	0	0	
1140 to 43	Wooden box and pen case...	Nunnhoo	...	...			...	
1144	Enamelled mica box ...	Mungal Babo	...	Ahmed Ali	5	0	0	
1145 to 48	Fan of white cloth ...	Madarbux	...	...		12	0	
1149	Cap or Crown made of mica used at marriages ...	...	...	Gopali Mali	1	...	0	
1150 to 53	Grapes and flowers made of wax	...	...	...				
1154	Flowers made of cloth ...	Madarbux	...	...	1	0	0	
1155	ditto ditto ...	ditto	...	...	1	...	0	
1156	Looking-glass engraved ...	Pundit Bishun Narain	...	...		...	...	
1157	do. do. in Persian ...	ditto	...	...	5	0	0	
1158	Peacock-shaped chandelier	Wali Mahomed	...	...	3	0	0	
1159	Enamelled ditto	ditto	...	...		2	0	
1160	Toy carriage with drum ..	Pundit Tootaram	...	...			6	
1161	ditto ditto, small ...	ditto	...	...			6	
1162	Mechanical figure	Roy Mohun Lall	...	...		..	...	
1163 to 67	Lac bracelets	Kareem Bux	...	...		...	...	
1168 to 70	ditto with silver work	Hafiz Mahomed Hossein	...	...		...	...	
1171 to 75	Copper betel box, Lucknow work	Gunga Ram	Lucknow	...		...	..	
1176 to 80	ditto ditto ditto	Punna Mull	...	...		...	...	
1181 to 84	ditto ditto ditto	Seetal Dass	...	...				
1185 to 88	Brass bits...	Nunnhoo	...	...	2	0	0	
1186 to 96	Golden thread and lace of sorts	Budhi	...	...		...	...	
1197 to 1208	Gold lace and other work	Jia Lall	Lucknow	...		...	.	Prices as marked.
1209	Bell metal anklet... ...	Ram Sahay	...	...	1	0	0	
1210	ditto ditto Gujri ...	...	...	...	1	0	0	
1211 to 17	Brass stirrup and bitts ...	Sullan	...	...		...	...	
1918	Benares kincob, rose colour	Manohur Dass	...	...	275	0	0	
1219	ditto of a different colour	ditto	..	...	350	0	0	
1220	Shawl, jamawar, white ...	Mohomed Jafir Kashmeri	Lucknow	...	200	0	0	
1221 to 23	Brass alarum lock... ...	Jewunbux	...	...	2	2	0	
1224 to 29	ditto ditto	Elahibux	...	...		...		
1230	Native blanket	Doorga	...	...	2	4	0	
1231	Dice and chess of glass...	Basheshur Nath	...	...		...	...	
1232	Brass spittoon	Seetul Dass	...	...	1	11	0	
1233	Bell metal water jar ...	ditto	...	...	3	1	0	
1234	Hard burned brick used for clearing the feet with ...	Birjmohun	...	...		6	0	
1235	Dara, a kind of drum kettle	...	...	...		1	0	
1236	A syringe used during the Holi with coloured water	Mahtab Roy	...	...		12	0	
1237	Box, coloured ...	ditto	...	...	...	...	...	
1238	Tubla or native drum ...	Kareembux	...	...		1	0	
1239	Dholuk, drum	ditto	...	...	5	0		
1240	Handkerchief, red ...	Birjmohan	...	...	2	0	0	
1241	Bracelet	Jewanbux	...	...	1	0	0	
1242	Spotted cloth	Hurgobind	...	...		12	0	
1243 to 46	Glass-ware	Kareembux	...	...	1	0	0	
1247	Earthen hookha, bidree pattern	Ghunsam	...	...				
1248 to 52	Earthen ware of sorts ...	ditto	Lucknow	...				
1253	Lac in balls	Birjmohun	...	...				
1254 to 59	Ornaments made of lead ...	Heeghun	...	...				

For the prices of other articles see vernacular list.

LOAN COLLECTION

Serial No.	Description.	Owner.	Remark.
2001	Golden worked hookah cloth, or mat.	Shaikh Altaf Hussain Khan of Lucknow.	
2002	Silver hookah with chilum, chumbur, and cover.	,,	
2003	Silver Box, ...	,,	
2004	,, Plate.	,,	
2005	Silver vinaigrette, fish shaped,	,,	
2006	Silver belt set with diamonds,	,,	
2007	Silver chilum and chumbur, ...	,,	
2008	Silver Box with cover, ...	,,	
2009	,, ,, set with cornelian...		
2010	Chowri with silver handle ...		
2011	Wine glass and plate, ...		
2012	Picture set in frame, ...		
2013	Gilt stick stand, ...		
2014	A book named Huft Bund ...		
2015	Ivory note book ...		
2016	China ware plate ...		
2017	A cup and plate with verses from the Holy Kuran on them.		
2018	Verses written in a good hand,		
2019	Gold work *Putka*, ...		
2020	Persian carpet, ...		
2021	Plate of jade ...		
2022	A large hookah with stand and pipe.		
2023	Velvet Musnud with gold work.	Roy Maharaj Bali son of Roy Umrao Bali	
2024	,, pillows for above, ...	ditto	
2025	,, side pillows, ...	ditto	
2026	A pair of plain shawls		
2027	Picture frame, ...	Shaikh Altaf Hussain Khan of Lucknow.	
2028	Gold work hookah mat, ...		
2029	Dustgi ...		
2030	Silver ring set with turquoise,		
2031	Silver horse trappings ...	Ruch Pall Singh son of Raja Shair Bahadoor.	
2032	Ditto ditto ...	ditto	
2033	Crown, set with rubies and diamond.	Nawab Mulka Jahan of Lucknow.	
2034	Khilut or coat of honour of zarbaft a kind of Benares cloth, in three pieces.	ditto.	
2037	Handkerchief with Gold work and embroidery.	ditto.	
2038 to 39	Pair of needle work red Shawls,	ditto.	
2040 to 41	A large Ghori cup and plate.	ditto.	
2042	Woolen Carpet (*Kaleen* ...	ditto.	

Seriel No.	Description.	Owner.	Remarks.
2043	Silver fan, ...	Nawab Ashruff-ood-Dowlah adopted son of the Choti Shahzadi of Lucknow.	
2044	Dolaye, or double sheet, rose colour.	ditto.	
2045	Doputta, kamdhani, ...	ditto.	
2046	Gold worked handkerchief ...	ditto.	
2047	Doputta with embroidery and lace work in silver	ditto.	
2048	Paijama, green colour and silk and gold work.	ditto.	
2049	Silver worked shumla (a kind of Cap.)	Shaikh Altaf Husain.	
2050	Pandan with 7 boxes and covers, one plate and a vinaigrette.	Thakurain Runjeet Koer of Pertabgurh.	
2051	Silver and gold spittoon ...	Thakurain Runjeet Koer.	
2052	Ditto hookah ...	ditto.	
2053	Silver work purse with knots and beads.	ditto.	
2054 and 55	Embroidered handkerchief ...	ditto.	
2056	Silver worked, velvet, saddle cloth.	ditto.	
2057	Needle work caps, two ...	Syed Muhamad Hossain, Inspector, Educational Department Zilla Pertabgurh.	
2058	Fans made of straw, three ...	ditto.	
2059	Baskets of straw, eight ...	ditto.	
2060	Jug made of straw ...	ditto.	
2061	Lamp stand of straw ...	ditto.	
2062	An engraved walking stick ...	Munshi Albaeli Pershad, son of Munshi Jawaher Singh, of Lucknow.	
2063 to 68	Picture and writings, six ...	ditto.	
2069 and 70	A frame set with a verse in flowery letters.	ditto.	
2071	A knife with a silver chain of three links.	Shaikh Altaf HossainKhan, son of Mohsun Ali.	
2072	Sword ...	ditto.	
2073	A piece of shawl, jamawar ...	Lala Madho Lall, of the firm of Salik Ram, Mahajuns Lucknow.	
2074	Silver rose water sprinkler ...	Darogha Abbas Ali.	
2075	Pair of native-shoes, embroiderd with gold.	Mr. A. Constable. Lucknow.	
2076	Native cap, green silk velvet, worked with gold and silver.	Ditto.	
2077	Silver box, finely chased, with moss agate lid.	Ditto.	
2078	Do. not such fine work as No. 2077.	Ditto,	
2079	Silver case for the pocket Kuran, No. 3 of the Oriental Mss, loan collection.	Ditto.	

Serial No.	Description.	Owner.	Remarks.
2080	Gold and silver embroidered outer cover for the above silver case.	Mr. A. Constable, Lucknow.	
2081	Ms. of Mir Hussan's Masnavi poems.	Sheikh Altaf Hussain.	
2082	Framed picture ...	ditto.	
2083	Papier maché letter case ...	ditto.	
2084	Ditto small ...	ditto.	
2085	Picture of one of the Timourides.	ditto.	
2086	A box with silver filagree work	ditto.	
2087	Silver hookah and fittings ...	Daroga Abbas Ali.	
2088	Gold belt set with diamonds and rubies.	Rajah Jug Mohan Singh.	
2089	Coral necklace set with diamonds.	ditto.	
2090	Brass slippers for use when in a Temple during Puja.	ditto.	
2091	Clogs made of Ivory ...	ditto.	
2092	Ivory pen case ...	ditto.	
2093	Ditto of wood with a mechanical figure on top.	ditto.	
2094	Ivory bed ...	ditto.	
2095	Small shawl embroidered with Sanskrit poem.	ditto.	
2096	Embroidered caps ...	ditto.	
2097	Silver hookah, cocoanut shaped,	Husainabad Endowment. ...	
2098	Silver shamiana poles ...	ditto.	
2099	,, chair with cushion and trappings.	ditto.	
2100	Shamiana, gold embroidered ...	ditto.	
2101	Silver bracket lamp, 12 lights...	ditto.	
2102	Necklace or "har" ...	Mir Wazir Ali, Kazmi. ...	
2103	Native pictures, ten, hung on walls, near exhibit 2104.	ditto.	

No. 2104 SELECTIONS FROM A COLLECTION,

(BELONGING TO Mr. A. CONSTABLE, OUDH AND ROHILKHUND RAILWAY),

ILLUSTRATING THE HISTORY OF PRINTING IN LUCKNOW, AND OTHER PARTS OF INDIA.

L'imprimerie est l'artillerie de la pensée.
Rivarol.

PRINTING IN OUDH.

GHAZI-UD-DIN HAIDAR, first King of Oudh, (began his reign as Nawab Wazir 1813, became king of Oudh, with the title of Shah-i-zuman 1817, died 1827, and is buried in the Shah Najaff) established in Lucknow, in 1818, within the precincts of his Palace, the Moti Mahal, the first printing press ever brought into Oudh.

The first book issued, *with a date*, from this press, was a Dictionary and Grammar of the Persian language, entitled هفت قلزم or, "The seven Seas," in seven volumes, folio, and printed throughout by metallic type. The printing of this Dictionary, which attained considerable celebrity among Orientalists, both in India and Europe, was finished in 1822, and presentation copies, splendidly bound in red morocco with gilt ornaments and tooling, are to be met with in many Public Libraries in Europe.

An Arabic Dictionary, explained in Persian, تاج اللغات "The crown of all Dictionaries," was another important work issued from the Royal Press of Oudh. It is contained in seven volumes, large folio, the first four being printed, the remaining three, lithographed. This Dictionary bears no date of imprint, but was probably completed, shortly after 1830.

It may be of interest to mention here, that the first lithographic press, ever used in Lucknow, was one worked by a Mr. Archer, formerly a printer at Cawnpore, who was invited to settle in Lucknow, and enter the service of His Majesty, King Ghazi-ud-din Haidar (1813-1827). The first book lithographed at this press was, the بهجت مرضیه a religious work, in 247 pp. 8vo: and dated 1831, when Ghazi-ud-din Haidar's successor, King Nasir-ud-din Haidar (1827-1837) was on the Throne.

With regard to the *Editio princeps* of the Oudh Press, the Owner of these exhibits is of opinion, for the reasons given below, that the "Panjsurah"* پنجسوره a small quarto volume, printed in the form of a "toghrá,"† No. 4 of this collection, was the first book, actually printed in Oudh.

It bears no date, but from the crudeness of its typography, and various mechanical defects, which professional Printers will readily detect, it affords strong internal evidence of being a "first attempt" in the noble Art. Moreover, a Muhammadan Ruler, would probably be anxious to inaugurate his first printing Press, by issuing from it, a manual of devotion for the use of the Faithful among his subjects. The owner of this volume was also informed by his friend, the late Muhammad Mir, oorf, Kamal-ud-din Haidar, for many years assistant to the late Colonel Wilcox, (4th Bengal Native Infantry—Bailun-ka-pultan) the Astronomer Royal of Oudh, that this Panjsurah was the first production of the Printing Press in Lucknow; be this as it may, the volume in question, (No. 4,) is a quaint and interesting specimen of the early press in Lucknow.

The Royal Founder of printing in Oudh, was wont to distribute gratuitously, the books he printed, and for many reasons, deserves to be held in remembrance, as an enlightened and munificent Patron of light and learning.

Ghazi-ud-din's successors were not disposed to carry on the Royal Press, nor even in fact to preserve carefully, the numerous volumes left by their ancestor, and Dr. A. Sprenger, of the Honorable East India Company's Medical service, and sometime Oriental Translator to the Government of India, who visited Lucknow in 1848-50, for the purpose of examining and describing, bibliographically, the Royal Library; reported, that part of the collection, kept in the Topkhana or Arsenal, (a building, near the Residency, between the existing Cemetry and the Iron Bridge, destroyed during the Mutiny) was stored in "about forty dilapidated boxes —camel trunks—which are at the same time tenanted by prolific families of rats, and any admirer of oriental lore who may have an opportunity to visit this collection will do well to poke with a stick into the boxes, before he puts his hand into them, unless he be a Zoologist as well as an Orientalist. At the end of the Hall there are bags full of books completely destroyed by white ants, even new books have not been spared by those destructive insects, nearly the whole edition of the Táj-ul-loghát has been destroyed, and most of the remaining copies of the Haft Qulzum have had the same fate."

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* Literally, "Five chapters," a collection of five of the most esteemed and comforting chapters of the Holy Kuran, to be used at the five times for prayer. The selection of the particular chapters to be included in such collections, is not, it is believed, definitely fixed by any rigid, hard and fast rule.

† A writing in the form of a monogram, "toghra" means involved or twisted, for a good specimen of toghra see No. 8 of this collection

Consecutive number in the Collection.	TITLE.
1	Vol. II. of the هفت قلزم Haft Qulzum, or "Seven seas." Printed at Lucknow in 1818-22.
2	Vol. I. of the تاج اللغات Taj-ul-Loghát or "Crown of Dictionaries." This copy was formerly in the possession of His Majesty, Wajid Ali Shah, Ex-King of Oudh (1847-1856) and bears the impress, in red, of the Royal seal.
3	A Lithographed volume, wants colophon, of the above
4	A "Panjsurah" پنجسورہ or collection of five chapters from the Holy Kuran. For arguments, in support of the Exhibitor's opinion that this volume is Oudh's "Editio princeps" see remarks above,
5	المناقب الحیدریہ Al Munakib-ul-Hydarea, or "The Praise of Ghazi-ud-din Haidar" written in Arabic, small folio, 288 pp, and printed at Lucknow in 1819.
	The present state of this volume, well illustrates the destructive ravages of that "Enemy of books," *Acarus eruditus*, or

THE BOOKWORM.

"There is a sort of busy worm,
That will the fairest books deform,
By gnawing holes throughout them.
Alike, through every leaf they go,
Yet of its merits nought they know,
Nor care they aught about them.

Their tasteless tooth will tear and taint,
The Poet, Patriot, Sage or Saint,
Not sparing wit nor learning.
Now, if you'd know the reason why,
The best of reasons I'll supply:
'Tis bread to the poor vermin.

Of pepper, snuff, or 'bacca smoke,
And Russia-calf they make a joke.
Yet, why should sons of science,
These puny rankling reptiles dread?
'Tis but to let their books be read,
And bid the worms defiance-"

Consecutive number in the Collection.	TITLE.
6	محامد حیدریہ Mahamid-i-Hydarea, or "A eulogy to the worth of Haidar." This book, written in Persian prose and verse, was printed at Lucknow in 1822.
7	گلدستہ محبت Guldasta-i-muhabbat, or "The nosegay of affection" printed at Lucknow in 1823, is an account, in Persian prose and verse, of the meeting between Lord Hastings (Governor-General and Commander-in-Chief in India, 1813—1822) and the *Nawab Wazir*, Ghazi-ud-din Haidar.

The meeting took place on the 25th October 1819, and is thus described by Lord Hastings in his private journal.* "The Nawab Vizeer met me about two miles from it" (*i. e.*, Lucknow) "and descended from his elephant. I quitted mine also, and after embracing him I got with him upon another elephant equipped with a magnificent howdah calculated to carry us both. This was the established etiquette. In this manner we proceeded to the city. The approach to it has nothing striking. Within, it has a better appearance than any other town, I have seen in India. The wealthier inhabitants were all in their holiday clothes on the flat tops of their houses. The various and lively colours of their shawls had a pleasing effect. I had been apprized that on this public entry, I must scatter money to the populace, as the Nawab Vizeer would do it to those on his side of the elephant. A bag containing 1,000 rupees had been prepared for me accordingly; it may easily be conceived what confusion arose in the narrow crowded streets from the scramble occasioned by this silver shower. An ostentatious liberality of this sort is practised on similar occasions by all the Indian sovereigns. The Nawab Vizeer, to gain popularity on his accession, made it a practice to throw more or less in this manner among the crowd every day he went abroad. He now finds the inconvenience of having introduced the custom, for the people pursue him with clamours if he forbears to make the expected donation. This is not the only mischief of the habit. It tends to brutalize the lower classes in such a degree, that I would on no account admit the practice in any of our cities. Several of the gentlemen, who were towards the rear of our cavalcade, told me that they saw shocking instances of ferocity in the attempt of individuals to wrest rupees from those who had been fortunate enough to catch them. Three or four stout young men were beating a helpless old wretch unmercifully with switches to make him yield his prize. A woman to secure a rupee which she had caught put it into her mouth, and a set of fellows were seen to grasp her throat, and squeeze it till the agonies of strangulation forced her to open her jaws. There was something exceedingly striking in the caution of the elephants not to trample upon the people, who were continually thrown down before them. Where they could not otherwise step clear, they would remove the fallen with their trunks. A horse having taken alarm in the crowd, and becoming riotous, the rider fell off, on which the elephant that carried one of my children and the governess, without any apparent direction from the driver, lifted the man by his arm with his trunk and raised him till he scrambled into his saddle. It is possible that the elephant might have been previously taught the trick; but its readiness of applying its lesson would even in that case be remarkable. As we proceeded, nautch girls in their grandest habiliments sang congratulatory verses from the top of the houses, with which we were generally on a level. Persons every now and then ran to meet us, throwing up into the air a number of live quails; a pretty compliment, as it was understood to mean a liberation of prisoners on the joyful occasion. We were long in reaching the palace," (the Moti Mahal) "which is at the further extremity of the town. It does not aim at any splendour, yet the number of courts through which one passes, gives it an air of considerable magnificence. Judgment, with regard to display, was manifest in the stationary elephants in one court; camels with their riders in another; cavalry in a third; and so on, varying the nature of the guard. At the door of the inner court but one, we quitted our elephants, as the passage was too narrow for them.

We proceeded in splendid palankeens to the steps which led up to the Sovereign's apartments, whither we ascended. They are convenient, neat rooms, in the English style, without attempt at grandeur. In one of them, which overlooked the Goomty river, there was a musnud, formed like a long European Court, raised on a platform of three steps. Both the musnud and the platform were covered with velvet, and the borders of the former were thickly embroidered with pearls, and with precious stones of a secondary rate. The Nawab Vizeer obliged Lady Loudoun and me to occupy the centre places".

It was Lord Hastings, who induced Ghazi-ud-din Haidar to assume the title of King, "Shah,"—and coin money in his own name, thinking that, as *King* of Oudh he would be a useful counterpoise to the *Emperor* of Delhi. "This was perhaps the most sterile stroke of the sterile science of diplomacy that was ever conceived or executed. The title never took much

* Edited by his daughter, the Marchioness of Bute, and published (second edition) by Saunders and Otley, London, 1866. Two vols. 8 vo. with map and index, to those volumes themselves we would refer the Curious for much interesting information regarding Lucknow, and Oudh generally. The Journal is dedicated to the "Dear little companions of my expedition," the preface by the Editor, the sole surviving companion (1866) is charmingly written, and contains much explanatory matter regarding the double Office his Lordship held.

root out of Lucknow, and though Ghazi-ud-din Haidar and this four successors were all titular Kings, their rule is far more commonly spoken of by the country folk, as the "Nawabi" than the "Shahi" "*

Consecutive Number in the collection.	TITLE.
8	A "Shujrah" شجرة or genealogical tree, in this case, of the twelve Imams or successors of the Prophet Muhammad. Lithographed, at the Newul Kishore Press Lucknow, in a fanciful form of "toghra".

PRINTING IN INDIA GENERALLY.

The first book issued by England's Prototypographer, William Caxton, with his name, and place and date of printing was "The dictes and notable wise sayings of the Philosophers." "Emprynted by me Wylliam Caxton at Westmestre, 1477;" and, as far as is known at present, the first book ever printed in India, with date and name of place, is a small quarto volume, a treatise on the medicinal plants and drugs of India, written in the form of dialogues, by Doctor Garcia Da Orta and printed at Goa by Jao : Da Endem, 10th December, 1563. Previous to this, the Jesuit missionaries issued from their press at Goa, religious manuals and primers, in Mahratta and Portugese, for the use of their Converts, but all the copies of these publications, hitherto discovered, are undated.

9	A copy of Da Orta's book, reprinted, verbatim, at Lisbon in 1872, edited by Varnhagen the distinguised Antiquarian, and published at the expense of the Portugese Government.
10	A copy of the Italian edition, Venice 1616, of Da Orta's work above mentioned. In this edition the arrangement of the book into dialogues has been altered, and notes and annotations by Italian and Spanish Doctors are added, together with rough woodcuts of several Indian trees, fruits, spices &c. This book lies open, in the case, at the chapter on Tobacco, in those days a great rarity in Europe.
11	A copy of one of the earliest books, printed in India, in which vernacular type is used. It is a treatise on Theology, in Tamil, written by Ziegenbalg† and one of his Colleagues, and printed at the Mission Press, Tranquebar, in 1717. It is said that the types used in printing this book, were cast by these Danish Missionaries, *from the leaden covers of some Cheshire cheeses*, which had been sent out to them, by the English Society for promoting Christian Knowledge.
12	The Life of our Saviour, داستان مسیح written in Persian by P. Hieronymo Xavier, by command of the Emperor Jahangir (1605-1627) at whose Court, at Agra, this Jesuit Missionary resided for several years. Jahangir, perhaps the most liberal minded of all the Mogul Emperors, being anxious to learn something of the Christian Religion, caused this book, the one described below (No. 13), and another, entitled آئینه حق نما "A Mirror showing Truth" to be writ-

* Page 112 of "The Garden of India; or Chapters in Oudh History and Affairs." By H. C. Irwin, B. A. Oxon., B. C. S. London, W. H. Allen, 1880.

† Zeigenbalg and Plutschau, both Danes, were the first Protestant Missionaries to India. Landed at Tranquebar in July 1706 For further particulars see the "Indian Missionary Directory" by the Rev. B. H. Badley, American Mission Press, Lucknow, 1876.

Consecutive number in the Collection.	TITLE.
	ten by P. Hieronymo Xavier (who must not be confounded with the great S. Francis Xavier) in Persian. Xavier's MSS: were afterwards all printed by the celebrated Dutch printers, the Elzevirs, at Leyden, and copies have now become very scarce and valuable.
13	The life of S. Peter, داستان سن پیدرو in Persian and Latin, by P. H. Xavier, Leyden. Elzevir 1639.

Note, for any Compiler of a Typographical Gazetteer of India. The first Printing Machine ever driven by steam in Oudh, is a "Gripper Machine" double crown size, by W. Conisbee, London. This Press, in the Printing Office of the Oudh and Rohilkhund Railway Company "Limited" Huzrutganj, is in daily use, was first worked (by steam) on the 18th October 1875, printing on that date, a "Goods forwarding note" form, and is driven by a 4 H. P. Portable Engine by Ruston, Proctor & Co., Lincoln.

No. 2105, SELECTION FROM A COLLECTION, OF EARLY VIEWS AND MAPS OF LUCKNOW, FYZABAD, AND OTHER PLACES IN OUDH. BELONGING TO MR. A. CONSTABLE.

The originals of these engraved maps and views, where noted, were all executed between the years 1766–1785, by Father Joseph Tieffentaller, a Jesuit Missionary, who was for many years Roman Catholic Chaplain in Lucknow, where he died in 1785, his mortal remains, being embalmed, were carried to Agra, where he rests—*Ad majorem Dei Gloriam.*

In 1875, Mr. F. S. Growse, B. C. S., at the suggestion of the exhibitor, very kindly made a search for Tieffentaller's grave, which was found at the back of the old Church, in the Bishop's compound, near the present Cathedral. The stone bears the following inscription.

PATER JOSEPH TIEFFENTALLER,
Obiit Lacnoi,
5th Julii 1785.

This venerable Priest was born at Botzen, in the Austrian Tyrol, in 1715, trained and destined for the life of an Apostle to the Indies, he landed, after a long and tedious journey, of 14 months from Lisbon, at Damaun, near Goa, in December 1743, and in 1766, after visiting many places, in Central and Northern India, arrived at Lucknow. He then spent 5 years in travelling over Oudh, also visiting Kumaon, surveying the River Ganges from the Sea to Hardwar, and the Gogra also, for a considerable distance. He was the first Geographer, to shew with almost absolute correctness, the true source of the Ganges, all maps previous to his, (even Rennell, until the issue of the 2nd edition of his map) shewing that River, as flowing from the Mansorawar Lake.

His Geographical description of Hindustan, translated from the original Latin. by John Bernouilli, the well known French Savant, and published at Berlin in 1786, in French and German, is full of the most varied and interesting information regarding Oudh, the North West and Upper India generally; and Tieffentaller, may justly be considered, as the first person who wrote a Gazetteer of these Provinces. All his descriptions are fresh and lifelike, as the work of such an intelligent eye witness, must necessarily be.

During the Mutiny, the records, of the Roman Catholic Church of S. Mary in Lucknow, containing many entries, and other records, in Tieffentaller's handwriting, were destroyed, along with the Church and the Priest's House.

For a tolerably full account of Tieffentaller, taken from the book above mentioned, we refer those interested in such matters, to a sketch of his life, in the Proceedings of the Asiatic Society of Bengal, for April 1872, written by Colonel A. S. Allan, late H. E. I. C. S.

Consecutive number in the collection.	TITLE.
1	Tieffentaller's map of the Ganges and Gogra, published by Anquetil Du Perron, Paris 1784. This map is the *first published attempt* to place geographical investigation in India, on a scientific basis. It would require more time and space than are now available, to even attempt, to give a suitable notice of this valuable document, which is therefore allowed to speak for itself.
2	Tieffentaller's plans of "Laknao" (Lucknow) and "Tschandarnagor" (Chandarnagore.)
3	Tieffentaller's views of the Nawab's Palace at Fyzabad (now an opium godown), and the Palace at Lucknow; now partly demolished, near the Muchi Bawan Fort, the buttresses which are standing to this day, are plainly delineated.
4	Plan of the Guptar Ghat temple at Fyzabad, the fine old tamarind tree still standing, is shown at one corner of the courtyard of the Temple.
5	Tieffentaller's plans of "Nimcar" (Neemkhar), and Rai Bareli, the large baoli, which is doubtless well known to many, is shown on the latter plan.
6	The confluence of the Sardah and the Gogra, as surveyed by Tieffentaller in January 1768.
7	View of Asoph-ul-Dowlah's (1774-1796) Palace (the Muchi Bawan) at Lucknow. A very fine large paper copy, of the engraving, a proof before letters, after the original by W. Hodges R. A. Hodges, the celebrated, landscape Painter, who came to India in 1780, under the patronage of Warren Hastings, remained out here until 1784, after amassing a large fortune, which he lost by an unfortunate banking speculation in England, where he died of a broken heart, 1796. The "kiosk" on the left hand of the engraving, will be recognized as one of those, only recently pulled down. One can also trace the Mosque, in the middle distance, and the Emambarah gateway beyond, all of which are still standing.
8	A very fine, large paper copy, in fresh, bright, clear, condition, of "The Bengal Atlas by James Rennell, F. R. S. late Major of Engineers and Surveyor General in Bengal, London 1781." It lies open, in the case, at the "Map of Oude, Allahabad and part of Agra and Delhi, including *the course of the Ganges to Hurdwar*" &c. Note, how cautious Rennell was to advance no further, the news of our Lucknow Padres' discovery, had not yet, 1781, reached London. See remarks at head of this section.

No. 2106. LOAN COLLECTION OF ORIENTAL MSS, AND SPECIMENS OF ORIENTAL LITHOGRAPHY EXECUTED IN LUCKNOW.

Consecutive No. in the collection.	Description.	Owner.
1	An illustrated manuscript copy of the Shahnamah, or "History of Kings," the great epic poem of Persia, by Firdousi, one of her most celebrated Poets. The Shahnamah has been called the Iliad of Persia, and Firdousi, the Homer of that country.	Mirza Agha Ali Khan Bahadur.
	This copy, in "nastalik" hand was written and illuminated in Persia, but wants the last leaf, so that the copyist's name cannot be stated. In fairly good preservation, and otherwise a valuable copy.	
2	A manuscript copy of the collected poetical works, of Sā-ib, one of the most popular Eastern poets, This copy is a very fine specimen of "nastalik" writing, uniform throughout, but bears no name of the scribe or date when wtitten. There is a note at the end, in the autograph of the Poet himself, to the effect that he has examined this copy and certifies to its completeness and correctness.	Do.

"The Aghai Sahib," one of the few remaining limks that connect Oudh, at a time when "the sword was king o'er the pen" with our Oudh of to-day, and who has so kindly allowed these valuable manuscripts, to be exhibited, formerly possessed a very complete and justly celebrated Oriental library. His books and manuscripts, as well as a vast amount of other valuable property, were destroyed during the troubles of 1857–58, and on his re-entering the smoking ruins of his town-house in Lucknow, the first thing he recovered, was the beautiful copy of the Shahnamah, No. 1 of this collection, which had been dropped at his threshold by some wanton plunderer, anxious probably, to bear away, other, in his eyes, more valuable *loot*.

3	A miniature, manuscript copy of the Holy Kuran, exquisitely finely written and illuminated, in Shiraz, 1866 A. D. For use, encased in a suitable silver cover, as an amulet. The writing, from beginning to end of the little book, is perfectly uniform. At the end there is a certificate, by a former owner, testifiing to its being a complete and correct copy.	Mr. A. Constable.
4	A manuscript of the Mesnevi poems of Jelaludin, Er-Rumi, of Qonya. Written in Persian, "shikast wa saffiah" hand, by the celebrated caligrapher Saad, in 1610 A D. It will be observed that each page of this priceless manuscript (formerly in the Imperial Library at Delhi and bought at the prize sale in 1858) has been let into a border of stouter paper.	Do.
	These poems, celebrated all over the East, give a very complete insight into the subtlest workings of Islam. The cultured Muhammadan looks upon the "Mesnevi" as the highest perfection of a devotional book—second only to the Holy Kuran itself, as a work the reception of which into the mind and heart is sure to lead him to a blessedness, as from it he learns to understand it—a production of the highest spiritual sanctification, leaving every thing else similar to it of religious contemplativeness and intensity, vastly behind.	Do.

Consecutive No. in the collection.	Description.	Owner.
5	Specimens of Oriental penmanship, by Kalb Ali, a very celebrated "fine-writer," (khushnaveez) executed in 1803 A. D., this album was formerly in the possession of the Hastings (Warren) Family.	Mr. A. Constable.
6	An Album of specimens of various styles of oriental caligraphy, executed to order, by the most celebrated, living, Kashmiri artists, in Srinagar, 1874 A. D.	Do.
7	An illustrated copy of the Masnevi of Mir Hussan, written in 1793 A. D. by one Khairat Ali. The paintings in this beatiful book are all executed with the delicacy of miniatures, and even when examined with a magnifying glass, appear soft, and exact, as to details. Mir Hussan's peom is very popular all over India, and in it will be found the Eastern fairy romance, of Prince Benazeer and the Princess Budreemunir.	Sheikh Altaf Hossein, Sahib.
8	A copy of the Anwar-i-Suhali, the Persian version of the fables of Pilpay, a well written, old copy.	Do.
9	Specimens of Caligraphy by Mahomed Bakur of Lucknow, a living artist, compare this modern work with No. 5 of this collection; the present age evidently demands "jaldi naveezes,"—*rapid writers*, not khushnaveezes,"—*fine writers*.	The Penman.
10	A copy of the Bostan, "Flower Garden," well written, on paper powdered with gold dust.	Sheikh Altaf Hossein, Sahib.
11	A copy of an abridgement, or literally, essence, of the Bostan. A *very* choice specimen of Persian writing, the delicate tint of the paper, hightens considerably the effect of the writing.	Do.
12	A copy of a book of devotional exercises for the use of the Moslem Faithful, a pocket edition, well written, on very fine "veneers" of sandal wood, each no thicker than "Overland paper," *a great curiosity*. Probably written about 1550 A. D., but wants the colophon.	Do.
13	A very curious Persian poem, the "Go-i-chaugan" or Game of Polo, the frontispiece, rather faded, represents a spirited incident in a match, being played by two Persian Princes. This copy was written in 1581 A. D.	Do.
14	A collection of poems on the advantages of good manners and morals. A very well written book, and dated, Bokhara, 1528 A. D.	Do.
15	An illustrated and richly illuminated copy of the Shahnamah, "History of Kings," see No. 1 above, written in 1622 A. D., by Mohammed Sadik, son of Hafiz Ibraheem. This copy is in good preservation throughout, and the owner offers it for sale for forty five Rupees. To any one desirous of acquiring a fine specimen of this eastern classic, well written and full of curious, delicate, miniature like paintings, this exhibit will prove a "great find."	Mirza Agha Haidar.

Consecutive No. in the collection.	Description.	Owner.
	SPECIMENS OF ORIENTAL LITHOGRAPHY.	Newul Kishore Press, Lucknow.
16	The Statutes of the most Exalted order of the Star of India, in Urdu. This is a very good specimen of the excellent work done by Munshi Newul Kishore of this city, whose Press is celebrated all over India. His editions of the Oriental classics, &c., being very correct, and sold at a moderate price.	
	The Newul Kishore edition of the Holy Kuran No. 17 of this collection, being held in special repute by Moslems all over India and the far East. Copies are sent for sale, to order, to many distant cities and places in Central Asia, and in Arabia itself.	
17	Lithographed copy of the Holy Kuran. In large, bold letters, written on the stone by Moulvi Hadi Ali, Sahib, according to the accepted rules for writing the sacred volume. When this book was in proof, it was revised by a committee of learned Moslem divines, and it is divided into its seven sections in such a way, that they all individually, form complete manuals for devotional exercises.	Do.
18	Specimen book of a few of the various styles in which oriental lithography can be executed at the Newul Kishore Press, colour printing has not yet attained that degree of perfection in India, which it has in Europe, (see the specimen of colour printing by Quantin of Paris, after a painting by Henri Pille, called "Le vieux Bibliophile" laid beside No. 18); but the chromo: of the hoopoe is by no means bad, and altogether, these exhibits, compare favourably with similar work, executed in former years.	Do.
19	A volume of poems and stories, privately printed by the author for presentation, written by Khawajah Amir-ud-din, whose nom-de-plume is "Pagli wallah." The mechanical execution of this book is particularly good, having been written on the stone, by Munshi Govind Ram, a local Caligrapher who enjoys a deservedly high reputation on account of his very artistic, and painstaking style.	Do.

Serial No.	Description.	Owner.	Remarks.
2107	Dagger with jade handle ...	Mirza Wazir Ali, Kazmi,	
2108	Ditto ,, white jade handle	Ditto.	
2109	Ditto ,, silver handle ...	Ditto.	
2110	Silver belt ...	Ditto.	
2111	A pair of white shawls ...	Ditto.	
2112	Shawl ...	Ditto.	
2113	Woolen carpet ...	Mir Ahmud Khan.	
2114	Bed cushion ...	Ditto.	
2115	Sorahi and plate, copper engraved.	Ditto.	
2116	Copper tray ...	Ditto.	
2117	Sword with gilt handle ...	Raja Krishn Dut Ram.	
2118	Ditto of waved pattern ...	Ditto.	

Serial No.	Description.	Owner.	Remarks.
2119	Bichua (a kind of dagger) with silver scabbard.	Raja Krishn Dut Ram. ...	
2120	A dagger with ornamented handle.	Ditto.	
2121	Powder flask, fish shaped ...	Ditto.	
2122	ditoo made of a shell ...	Ditto.	
2123	Embroidered velvet coat ...	Ditto.	
2124	A saddle cloth, embroidered with gold.	Ditto.	
2125	Armour with gilt flowers ...	Ditto.	
2126	Persian sword with ornamented scabbord.	Maharaja Putab Narain Singh.	
2127	Neck lace set with diamonds ...		
2128	Tamjan with embroidered top		
2129	Silver chair ...		
2130	Saddle cloth, embroidered with pearls.		
2131	Saddle, embroidered with gold,		
2132	Pistol holsters ditto ditto.		
2133	Musnud or cushion, with pillows		
2134	Katar, or short dagger, for thrusting with.		
2135	Large dagger ...		
2136	Small ditto ...		
2137	Knife ...		
2138	Sword, almani blade, ...		
2139	Khanda, or straight sword ...		
2140	Sword, Shah Hossaini Pattern		
2141	Ditto Nagdawun ditto		
2142	Persian sword bearing the seal of King Nasir-ud-din Haider, (1827—1837).		
2143	M. L. gun, made at Fyzabad		
2144	Umbrella do. ...		
2145	Stick with gun do. ...		
2146	Lock do. ...		
2147	Screw lock do. ...		
2148	Betel nut cutter ...		
2149	Sandal wood chowri ...		
2150 and 51	Paper and mica chandelier ...		
2152	Persian sword ...		
2153	Silver pen case ...		
2154	Isphani sword ...	Mohammad Ahmud Khan. ...	
2155	Silver Howda, valued at Rs. 3,500 English pattern.	Raja Sarupjeet Singh. ...	
2156	Ditto „ „ „ 2,200	Ditto.	
2157	Silver tamjan „ 4,000	Ditto.	
2158	Belt, enamelled „ 1,000	Ditto.	
2159	Persian sword „ 1,200	Ditto.	
2160–61	Persian sword, and belt, set with turquoises, ...		
2162	Silver horse trappings, ...		
2163	Velvet coat embroidered with gold, ...		
2164	Shawl, „ „ „ ...		
2165	„ Over coat or cloak, ...		

Hal No.	Description.	Owner.	Remarks.
2166	Achkun, or native "Ulster,		
2167	Silver pen case with inkstand,		
2168	Native, silver powder flask, ...	Chowdhri Khaslut Hossain,	
2169	Cocoanut shaped hookah with	Do.,	
2170	fittings, ...	Do.,	
2171	An engraving by Earlom after Zoffany's* celebrated picture, of the "Lucknow cock fight." As was Zoffany's practise, all the figures introduced are portraits. Col. Mordaunt, who lies buried in the old cemetery at Cawnpore, was a natural son of the Earl of Peterborough, sent to India at an early age he led a curious wandering life, ultimately finding his way to Lucknow; where, by his being a great adept at various manly sports, he attracted the attention of Asoph-ul-Dowla 1774–1796 to whose Court he became attached.	Mr. H. J. Sparks, B. C. S.,	
2172	Earlom's engraving of Zoffany's picture of "Hyder Beg Khan's embassy to Calcutta." Hyder Beg was Asoph-ul-Dowlah's (1774–1796) Prime minister, and the object of his embassy to Calcutta was to endeavour to persuade Lord Cornwallis, the Governor General of India (1796–1805) to withdraw the Company's troops from Cawnpore and Fathigarh, the pay of these troops ostensibly kept up for the protection (?) of Oudh, being a heavy charge on its Revenues.	Ditto ditto.	

* Johann Zoffanij or Zoffany R. A., elected in Academician 1769 on the nomination of King George III, born in Germany 1723, died at Kew near London, where he is buried, November 11th, 1810. These dates are taken from *his tombstone*, all the standard (?) Biographical &c., Dictionaries, copying each others errors, vary, as regards many of the leading dates of his career. Came to India in 1781, painted chiefly in Lucknow, where he made a fortune by his brush, & returned to London about 1786. In addition to the many picture close up she painted in Oudh, there is the well known altar piece of the Old Cathedral, now S. John's, in Calcutta, the "Marriage at Cana." In addition to the "Cock fight" and "Hyder Beg's embassy," Nos. 2171 and 2171, Earlom engraved "An Indian Tiger hunt," these three, being Zoffany's largest Indian works were finished in England, from sketches taken on the spot. Lucknow possesses the fine original Zoffany, No. 2212, and there are other picture portraits, which recent personal enquiries have brought to light, which are also unmistakably by the same Artist.

In the Shah Najaff there is a painting by a Native Artist, which has traces of the "motif" of the "cock fight" picture. It was painted to order, and from memory 1 1 after the Mutiny, to replace, a replica of Zoffany's original, formerly in the Shah Najaff, but looted in 1857.

The inclusion in this exhibition of these and other pictures in this room was an after thought, but it is hoped that it may prove the modest beginning of future loan exhibitions of pictures and engravings of local interest, painted or engraved by English and Indian Artists, in India. *Hundreds of very valuable paintings and engravings do exist in our midst in various parts of this vast country,* only requiring a little search to bring them forth.

Serial No.	Description.	Owner.	Remarks.
2173	Water jug with silver cover,	Hakim Muhammad Raza,	
2174	Silver hookah small pattern, with fittings, ...	Do.,	
2175	Silver box for the spices used with pawn, ...	Do.,	
2176	Silver hookah with fittings, large,	Do.,	
2177	Persian verses, ...	Do.,	
2178	Gujrat sword, ...	Raja Teluk Sing,	
2179	Matchlock made at Sandi, ...	Do.,	
2180	,, ,, ...	Do.,	
2181	Silver cup with cover and plate,	Do.,	
2182	Shield with 4 silver bosses ...	Meerun Sahib	
2183	A jade cup	Ditto.	
2184	Persian sword with green velvet scabbard.	Ditto.	
2185	Turkish sword with green velvet scabbard.	Ditto.	
2186	Turkish, straight sword ...	Ditto.	
2187	Hookah smake, bidri work ...	Aushik Jafar Khan. ...	
2188	Sorahi with chain do. ...	Ditto.	
2189	Bottle do. ...	Ditto.	
2190	Goorgoori, small hookah bidri work.	Ditto.	
2191	Small hookah bidri work ...	Ditto.	
2192	Tray do. ...	Ditto.	
2193	Stool with do. at corners.	Ditto.	
2194	Scent box ...	Ditto.	
2195	Enamelled silver lotah ...	Ditto.	
2196	Shawl, large handkerchief, black.	Ditto.	
2197	Ditto ditto red ...	Ditto.	
2198	Sorahi of wood with plate, Multan work.	Mirza Fyaz Beg ...	
2199	Sandal wood pen case with inkpot.	Ditto.	
2200	Wooden box, Fyzabad work ...	Ditto.	
2201	Gun in case with fittings ...	Raja Kazim Hoosain ...	
2202	Turquoise necklace in a box ...	Ditto.	
2203	Silver howda ...	Raja Bulbuddur Singh ...	
2204	Matchlock ...	Ditto.	
2205	Rhinoceros hide shield ...	Mir Wazeer Ali, Kazmi ...	
2206	Ditto ...	Ditto.	
2207	Book rest oriental pattern ...	Ditto.	
2208	Woolen carpet ...	Ditto.	
2209	Ditto ...	Ditto.	
2210	English knife ...	Ditto.	
2211	A portrait by a Calcutta artist, after the original by Zoffany in the Calcutta Martiniere, of Major General Claud Martin, H. E. I. C. S. born at Lyons, in 1735, died at Lucknow, in 1800, where he is buried. Time does not admit of any detailed notice here, of this	La Martiniére College Lucknow	

Serial No.	Description.	Owner.	Remarks.
	true Philanthrophist to whose splendid endowments at Lucknow, Calcutta and Lyons, thousands owe all they possess. The compiler of this Catalogue may, when leisure permits him, attempt a Monograph on Claud Martin, and Lucknow life generally, in bye gone days, for which he has collected a mass of unedited and at present, raw material.		
2212	The Ghori Beebee, or Fair Lady dy, and her attendant Zulficar,* also called James Martin, an original painting by Zoffany. The Ghori Beebee, a Persian, sold, when eight years of a age, to Martin, by Monsieur Caré, a Frenchman, who went about to the different Native Courts of the period, throughout India, selling beautiful Circassian and Persian slave girls. When this Lady was 15 years of age, she was married to Claud Martin, survived him for several years, and is buried in the tomb, in front of the Lucknow Martiniére, close to Hodson's grave.	La Martiniére College Lucknow.	
2213	A very fine proof, before letters, of Earlom's engraving of the "Lucknow cock fight", see No. 2171.	La Martiniére College Lucknw.	
2214	A copy, by Mr. H. G. Spencer, of La Martiniére College Lucknow, of Zoffany's picture of the Ghori Beebee, see No. 2212.	Mr. A. Constable.	
2215	Cap., Jais muslin work.	Raja Sookh Mungal Singh	
2216	Ditto. Ditto.	Ditto.	
2217	A protrait of Prince Mirza Sulema Kadr, Bahadur, younger brother of His Majesty, Wajid Ali Shah Ex-king of Oudh (1847-1856). This picture is by Burra Mirza, son	The Prince.	

* Zulficar's descendants are still alive in Lucknow, he lived to a good old age, and is buried at the back of the musjid, which he built, standing on the high grond, near Hills' Hotel, at the corner of the Pir Jaleel Road. The house at the corner of Gola Gunj and Jao Lall's Bazaar formerly occupied by Fidda Hoosein, Sahib, was the Ghori Beebee's town house, and close by in an open space near Kalka Singh the well known watch maker's house, was Claud Martin's gun powder Factory, still known as Barud Khana. A very old man, alive in 1873, but since dead, informed the compiler, that as a boy he and his companions used to amuse themselves by watching the Nawab Wazir's officials, proving samples of the powder, before they took it over from General Martin. A standard charge was put in to a cannon with a ball in it, and fired off, if the "golee" did not reach a certain mark the powder was rejected.

Serial No.	Description.	Owner.	Remarks.
	son of Mani Rakâm Khan, a celebrated Lucknow Artist, still living.		
2218	Sword, nagdamun, silver handle	Prince Sulema Kadr.	
2219	Mundeel or coronet ...	Ditto.	
2220	An eight cornered cap ...	Ditto.	
2221	Velvet coat, embroidered ...	Ditto.	
2222	Night sheet, shawl, embroidered	Ditto.	
2223	Silver belt set with diamonds		
2224	Gold belt	Ditto.	
2225	Shawl handkerchief embroidered with gold, with lace all round	Ditto.	

For descriptions &c., of remaining articles in loan collection, see labels attached to each.

Answers to questions asked in Government Resolution No. 168, dated 29th January 1880, by Thakur Pertab Ruder Singh, dated 8th February 1881.

QUESTION.—*To what extent are endeavours on the part of Talukdars or Government or both, for the introduction of well-irrigation by bullocks necessary or possible?*

ANSWER.—*Firstly.* There were many advantages in the custom which prevailed in former times of irrigating fields by the water of jhils or tanks. Irrigation is still carried on where there are remnants of those jhils or tanks, but traces only can be found of them at present, most of them having been filled up and used for cultivation.

Secondly.—The existence of these jhils or tanks was very useful. The width of the space over which they extended was productive of a great deal of aqueous vapour which impregnated the air with moisture. The heat was on that account average and was approximately 90° in intensity. Now owing to the dryness of air consequent on the diminution in aqueous vapour, the heat instead of remaining stationary at 90° rises to more than 100°. In the rainy season, owing to a plentiful supply of aqueous vapour, rains continued in former times, from 4 to 6 days without intermission, and were highly beneficial to cultivation. Jhils and tanks were full of water. Besides, the timely and sufficient rain-fall during the rainy months had an equalising effect over the temperature in other seasons.

Thirdly.—The absence of these jhils and tanks has given rise to a diminution in aqueous vapour and a corresponding increase in the dryness of air. The regularity of seasons has disappeared. In the rainy season wind blows to the north, *i. e.*, towards Bengal, whence it turns to the west and coming in contact with the Himalayas is cooled, and reduces the atmosphere of the whole country. The aqueous vapour of the surrounding atmosphere according to the proportion in which it exists, is thus cooled and falls in large drops as rain, which, however, owing to there being no jhils or tanks cannot be collected for irrigation, but flows down into the ocean by rivers and streamlets.

Fourthly.—The cowdung and decayed vegetable and animal matter were washed away by the rains and settled at the bottom of the jhils and tanks. At the close of the rabi harvest, when the soil was prepared for the reception of kharif, the clay of these jhils and tanks therefore served in former times, as manure which improved the fertility and increased the outturn.

Fifthly.—In these jhils and tanks fishes, singharas. kaserus and kamal-gattas were abundant. The poorer class of cultivators after paying the zamindar's rent from the proceeds thereof utilised a portion of them for their own consumption and sold the remnant. Both zamindars and cultivators have now to suffer a loss.

Sixthly.—Well-irrigation was formerly used in horticulture and gardening but it has now extended to agriculture. It is however inaccessible to the mass of cultivators. One masonry well can only irrigate 12 bighas of land, and its estimated cost is about Rs. 300 to 500. At this rate few wells will suffice for a village. But only wheat, barley and oats will profit by well water.

* * * * * *

Seventhly.—Now that Government has resolved to facilitate agriculture by improved methods of irrigation, to guard against any decrease in outturn caused by scanty rainfall, and in short to save people from the effects of famine, it is impossible that the object of Government will be accomplished without the aid of canal or well-irrigation. Three-fourths of the people of Hindustan live on coarse kharif corn (mota anaj) and the absence of kharif brings on famine. Kharif crops cannot be made to depend on well-irrigation alone. They are sown in immense quantities, and well-irrigation is not sufficient for them.

Eighthly.—Well-irrigation costs about Rs. 2 per bigha, and kharif requires 3 irrigations in the year, so that the cost of well-irrigation is Rs. 6 per bigha, exclusive of rent, seeds, &c.

Ninthly.—Instead of wells and canals, if old jhils and tanks, traces of which are only left, are dug out, or deepened by takavi advances, and where possible, reservoirs 30 cubits broad, 10 or 12 cubits deep, and of appropriate length (whose digging costs Rs. 500 to 700 per mile) are made, and where there are reservoirs at the extremities of roads, if the reservoirs are deepened and broadened so as to contain water, and the expenses thereof defrayed from the local rate or taxes levied for public convenience or famine relief, the following advantages will result to the agriculture of the country.

It has been found out by experiment that instead of 12 bighas of land irrigable by a well, 1,200 bighas will be irrigated by a tank or jhil which have cost the same amount as a well. There is thus an advantage in laying out the money incurred in sinking wells in digging out tanks. The ryots will be very glad to dig tanks with the assistance of Government.

Tenthly.—If it is urged that tanks and jhils cannot be full of water, unless a sufficient quantity of rain falls, it may be said in defence that there has never been a year in which there were not two or three showers from the 10th June to 25th July. This quantity supplies the tanks with water sufficient to irrigate the whole land sown with kharif crops.

2ND QUESTION.—*What steps are necessary for the improvement of cattle and their fodder?*

ANSWER.—*Firstly.* Every cultivator in the village used in former times to have a great number of cows, buffaloes, mares, and sheep, &c., whose milk they sold. The animals propagated their species and multiplied in number. Bullocks for carts and ploughs, as also milk and ghi were thus very cheap.

Secondly.—There being no pasturages or jungles now, the ryots have no means of nourishing animals. Even at the present day at the tarai and places near Nepal where pasturages are found, the number of animals when compared with other parts of the country bears the proportion of 1,000 to 100. The fodder and pasturages having diminished, cattle are weak. Hay and dry fodder are their only food. Where pasturages and fodder are still left, cattle are strong, and cultivators from all parts of the country go there to purchase cattle.

Thirdly.—If the improvement of agriculture and the convenience of public are sought, it is necessary that a spacious jungle should be set aside for every two or three contiguous villages. If the land thus set aside for pasturage be utilised for cultivation after three or four years, a good harvest especially of *chari* may be reaped. In the meantime another piece of land may be employed for pasturage. Many villagers will keep up cattle if pasturages are accessible to them, and a great increase in the number of cattle will result therefrom.

Fourthly.—The next question is that of improvement in the breed of cattle. For this reason, it is necessary, that Government will get cattle of good breed from other parts of the country and entrust them to the zemindars who may distribute them to some selected men of the village and realize their costs in two or three years. A few of the animals, the zemindar may maintain himself, and distribute their offsprings to the villagers. The breed of the animals will thus be improved. The estimated gain by this means has been described in my book styled Cher Sakhia.

3RD QUESTION.—*Can any scheme be devised by which seed of good quantity may be distributed ?*

ANSWER.—*Firstly.* In former times, the Brahmins and Ksatriyas had to pay a comparatively less amount of rent than other cultivators, in consideration of their not cultivating fields themselves, and they grew a greater variety of corn than others. They deposited their corn in a sort of subterranean barn (kuthar). They sold corn to those who wanted them for food at 25 per cent. profit and those who wanted them for seed at 50 per cent. profit. The corn intended for seed were of the very best quality. The Brahmins and Ksatriyas are now reduced to poverty owing to the increase in their rent. Most of their corn is sold in liquidation of unpaid rent. The remainder does not suffice for their food for few days. This is the reason why ryots cannot procure good seed at proper time.

Secondly.—To ensure convenience in the supply of good seed, the zemindars and respectable men of three or four villages should be required to pay a subscription varying from Rs. 5 to Rs. 100. The subscriptions thus collected should be supplemented by a Government advance of an equal amount paid out of the fund raised by local rates and taxes for famine relief and public comfort. This sum should be appropriated in the purchase of good seed by a committee formed for the purpose. Zemindars may be allowed to deposit these seeds in their *kuthars*, and distribute them in time of need to ryots at 50 per cent. profit, realizing the cost at the close of

the harvest. The zemindars may enjoy the profit themselves and pay the sum advanced by Government out of it in three or four years by instalments. In years of drought and famine, this method will be very useful. There will then be no rise in price owing to the abundance of stock even if there is no rain for one year.

4TH QUESTION.—*Whether an English plough is suited to the agricultural conditions of Oudh, and whether its quality can be conclusively ascertained by means of an experiment?*

ANSWER.—The English plough turns up the soil to a depth of 10 inches.

* * * * * *

No cultivation is possible in India unless with the use of hoes. A bigha of land dug up by hoes costs about Rs. 1-8 or 2. An English plough digs up with difficulty 4 biswas of land lying fallow for 3 years, and the cost per bigha will not be less than Rs. 2-8. On the other hand strong bullocks are required for English ploughs. When an Indian cultivator cannot procure a pair of bullocks worth Rs. 20, much less can he be expected to get a pair for Rs. 60 or 70. One native plough and its share are procurable for Re. 1 or Rs. 1-4, which some cultivators can with difficulty afford to pay. They cannot be supposed to purchase a plough costing about Rs. 10 or 12. Indian cultivators dig up the land by hoes, and use plough only in breaking up the clods. Hence the implements which are at present in use in India are enough. Efforts should however be made to improve them. In order to improve the ploughs it would be necessary in the first instance to improve cattle in the manner stated above. Wood should be made accessible to cultivators who may, in that case, prepare all the necessary implements. Wood has become very scarce for want of trees and jungles in villages. India is a land of cultivators, and if it has all the necessaries of cultivation within its reach, it can suggest new methods of agricultural improvement. The evil which lies at the root of the poverty of cultivators is that no land or jungle was set apart at settlement for pasture of cattle and for wood. Government has not left a single piece of land rent-free. Zemindars have therefore brought under cultivation all land in their possession. If Government pays some attention in this direction, some relief may be possible.

5TH QUESTION.—*How will the country be benefitted by the encouragement of arboriculture?*

ANSWER.—By the encouragement of arboriculture, the ryots will be able to have access to a greater variety of fruits than they had hitherto had.

Arboriculture can be encouraged in two ways.

1st—If any land is let for the purpose of gardening, the rent of it may not be increased at next settlement, that the owner of the garden may have an opportunity of enjoying its outturn after laying out money for its irrigation and other improvements.